DRAFT
AMERICAN WOODCOCK CONSERVATION PLAN

Woodcock Task Force

Migratory Shore and Upland Game Bird Working Group
Association of Fish and Wildlife Agencies
August 2006

EXECUTIVE SUMMARY

The American woodcock (*Scolopax minor*) is a popular game bird throughout eastern North America and is managed on the basis of two populations: Eastern and Central. Both populations have experienced significant declines since surveys were first implemented in the mid-1960s. Loss and degradation of early-succession forest habitat is believed to be the primary causal factor responsible for these declines. Changes in land-use and negative societal attitudes towards even-aged forest management practices (i.e. clear-cutting) that create early succession habitat will likely contribute to continued declines in woodcock populations. The American Woodcock Conservation Plan documents changes in woodcock densities and habitat that occurred from the early 1970s to present. Population density deficits were calculated and specific habitat acreage goals for erasing such deficits were developed.

There has been a loss of over 839,000 singing male woodcock since the early 1970s. This corresponds to a population density deficit of just over 778,000 males. Approximately 27.8 million acres of new woodcock habitat needs to be created in order to eliminate this deficit and return woodcock densities to those observed during the early 1970s.

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CHAPTER 1: INTRODUCTION

The American woodcock (*Scolopax minor*) is a popular game bird throughout eastern North America. Approximately 522,000 hunter days were expended to harvest nearly 303,000 woodcock in the U.S. during the 2003-04 hunting season (Kelley 2004).

Woodcock are managed on the basis of 2 regions or populations, Eastern and Central, as recommended by Owen et al. (1977; Fig. 1). Population trends are monitored by the Singing-ground Survey (SGS) within each state and province in the central and northern portions of the woodcock's breeding range (Fig. 1). The SGS was developed to exploit the conspicuous courtship display of the male woodcock. Early studies demonstrated that counts of singing males provide indices to woodcock populations and could be used to monitor annual changes (Mendall and Aldous 1943, Goudy 1960, Duke 1966, and Whitcomb 1974). There have been long-term (1968-04) woodcock declines of 1.9 % per year in the Eastern Region and 1.8% per year in the Central Region (Kelley and Rau 2006; Fig. 2).

The ratio of immature birds per adult female in the harvest provides an index to recruitment of young into the population, and is measured by the Wing-collection Survey. Age and sex-related plumage characteristics (Martin 1964, Sepik 1994) are examined on approximately 10,000 wings submitted by hunters each year to derive the recruitment index. There have been long-term declines in woodcock recruitment in both regions (Fig. 3). Wing receipts also provide information on the geographic distribution of the harvest (Appendix 1).

It is widely believed that loss of early succession forest habitat is responsible for the observed declines in woodcock recruitment and overall population status. The Woodcock Task Force of the Association of Fish and Wildlife Agencies was formed to document losses of woodcock habitat that have occurred during the past 3 decades, and to develop habitat management recommendations that are needed to halt, and ultimately reverse, population declines. The Task Force recognizes that significant acreages of former woodcock habitat have reverted to land uses that make them forever unavailable to new management efforts. Therefore, we did not entertain an approach to developing objectives that involved striving for a return to absolute population *sizes* observed during the early 1970s. Instead, we adopted a framework for returning woodcock *densities* to former levels.

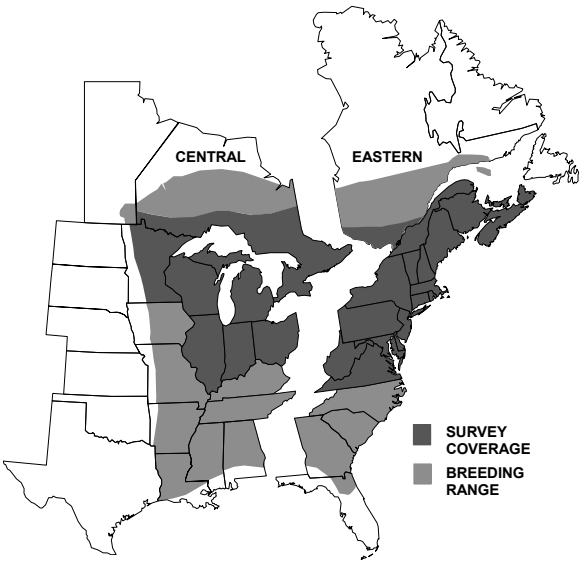

Fig. 1. Woodcock management regions, breeding range, and Singing-ground Survey coverage.

Goal: To halt the decline of woodcock populations and return them to densities which provide adequate opportunity for utilization of the woodcock resource.

Objectives:

1. Halt woodcock population declines by 2012 as measured by the Singing-ground Survey.

2. Achieve positive population growth by 2022 as measured by the Singing-ground Survey.

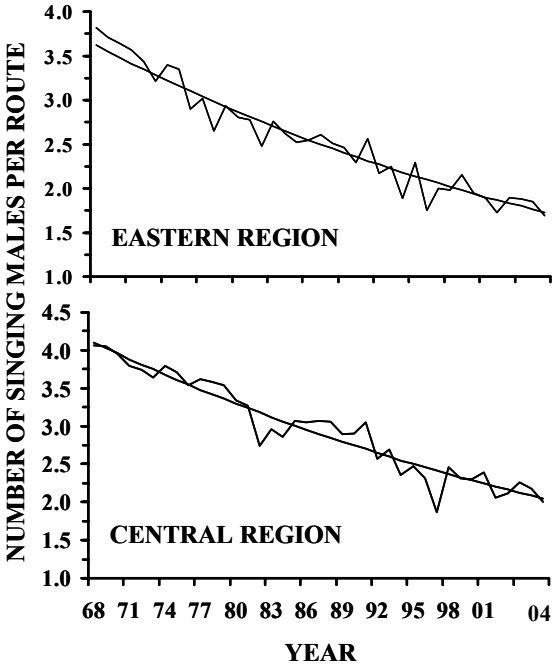

Fig. 2. Long-term trends (smooth line) and annual indices of the number of woodcock heard on the Singing-ground Survey, 1968-2006 (Kelley and Rau 2006).

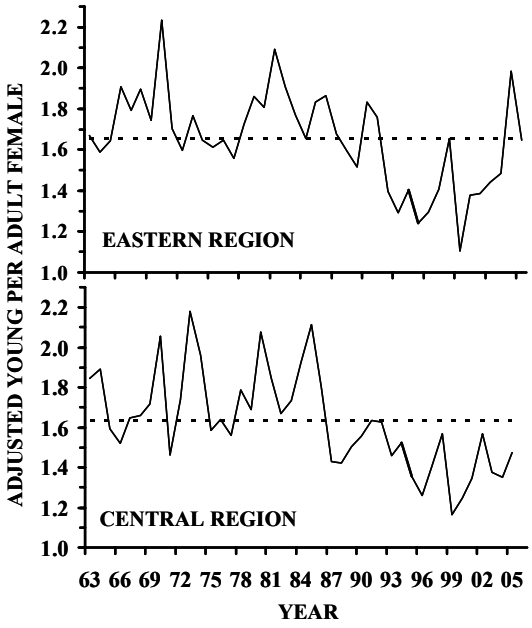

Fig. 3. Weighted annual indices of recruitment (U.S.), 1963-2005. The dashed line is the 1963-2004 average (Kelley and Rau 2006).

Objectives (cont'd):

3. Halt decline of early-succession habitat by 2012 as measured by the Forest Inventory Analysis system.

4. Increase early-succession habitat by 2022 as measured by the FIA.

Woodcock Ecology and Management

Breeding

Habitat important to breeding woodcock can be divided into several categories (Fig. 5):

Singing grounds: Male woodcock perform courtship activities in a variety of openings such as clearcuts, natural openings, roads, pastures, cultivated fields and reverting agricultural fields. The quality of singing grounds is influenced by the proximity of nesting and brood-rearing habitat. Singing grounds are often less than 100 m from diurnal cover (Straw et al. 1994).

Nesting and brood-rearing habitat: Most woodcock nests are in young second-growth hardwood stands that are near feeding areas as well as near singing grounds. Woody stem density of nesting areas varies between 14,600-49,000 stems/ha. Preferred brood habitat is characterized by a protective dense hardwood cover on good soils that support an abundance of earthworms (Straw et al. 1994).

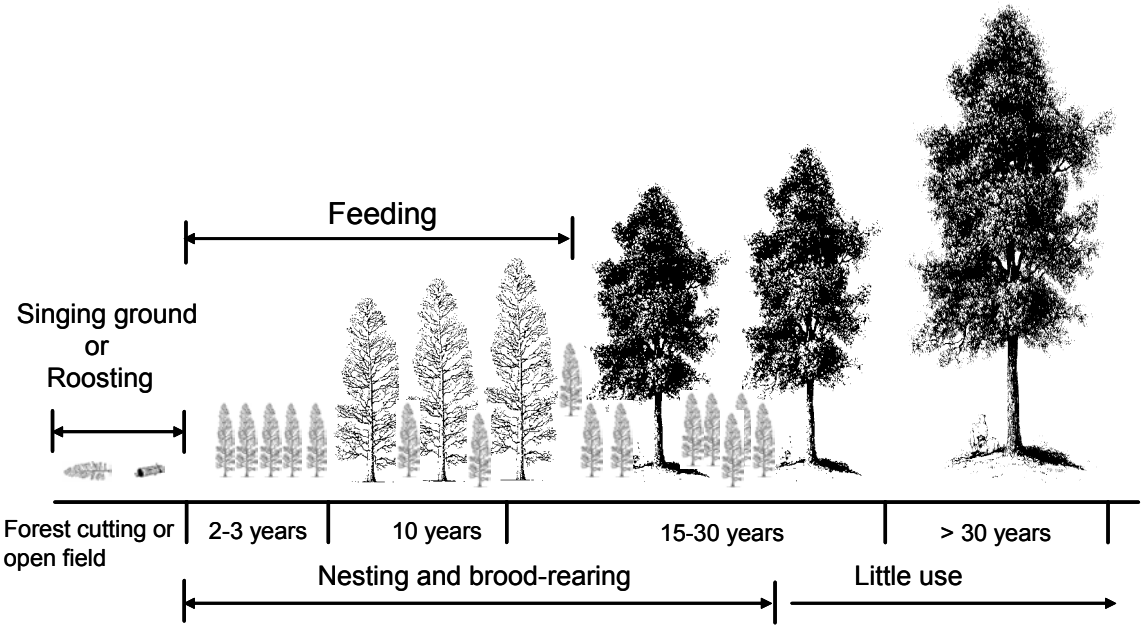

Figure 5. Key habitat components required by woodcock in relation to forest succession.

Diurnal habitat: A wide variety of plant species may comprise suitable diurnal habitat, but important indicators of good habitat are those that are early-successional or have growth forms that provide adequate protection for birds. The abundance of earthworms is a critical determinant of woodcock use of a site. Birds may sometimes use more mature forest if there is a dense understory. Use of coniferous stands is minimal in northern breeding areas (Straw et al. 1994).

Nocturnal habitat: Woodcock often leave diurnal areas at dusk and fly to openings such as clearcuts, abandoned agricultural fields, and pastures (Straw et al. 1994).

Migration and Wintering

Little is known about the habitat requirements of woodcock during migration. Sheldon (1971) outlined potential woodcock migration pathways based on band-recovery data. Recent telemetry studies in the Central Region have begun to provide further insights to the migration pathways used by woodcock (Myatt and Krementz, unpublished data). Krementz and Jackson (1999) have developed a habitat management manual for wintering woodcock.

Diurnal habitat: Diurnal habitat use by woodcock on the wintering grounds varies widely. Forest types used range from bottomland hardwoods to upland pine and pine-hardwoods (Roberts 1993). Bottomland habitats used typically are found in the middle zones of the floodplain, above the oxbows dominated by baldcypress and swamp tupelo but at lower elevations than upland forests. Dense monocultures of southern pines tend to acidify soils and degrade habitat for woodcock (Krementz and Jackson 1999). However, southern pine (longleaf, shortleaf, loblolly and slash) forests can provide good woodcock habitat if there is a suitable understory and a litter layer with good soils underneath (Krementz and Jackson 1999). Specific areas used by woodcock in pine forests are often depressions or drainages dominated by hardwoods (Roberts 1993). In a study of the use of prescribed fire in pine stands it was determined that recently burned stands were preferred

by woodcock due to the presence of bare soils, compared to stands burned 2-3 years earlier (Johnson and Causey 1982).

Nocturnal habitat: Nocturnal woodcock habitat during winter includes pastures, fallow fields, agricultural fields, and young clearcuts (Roberts 1993). Woodcock in Louisiana commonly use taller unmowed sections of pastures and wet areas, but extremely dense vegetation may need to be mowed or grazed to create a more open condition (Glasgow 1958 *in* Roberts 1993). In the southestern U.S., young clearcuts or old fields were preferred as nocturnal habitat compared to pastures or hayfields (Krementz 2000). Presence of shrubs and bare ground that provides easy access to soil for foraging seem to be important site factors (Krementz 2000).

Singing grounds: A variety of openings are used by male woodcock for singing grounds in the south, but they seem to prefer brushy fields or young pine plantations (Roberts 1993).

Nesting and brood-rearing habitat: Habitat requirements of nesting woodcock in the south are not well known (Whiting and Boggus 1982). A description of 32 nest sites in Alabama indicated that 61% occurred in mixed pine-hardwood, 17% in hardwoods, 13% in pines, and 9% occurred in open sites (Roboski and Causey 1981). Tree basal area on nest sites ranged from 5 to 37 m^2/ha, and stem densities ranged from 5,000 to 50,000 stems/ha (Roboski and Causey 1981).

Factors Responsible for Population Declines

Most biologists believe that loss of early-succession forest habitat throughout the range is responsible for the observed declines in woodcock recruitment and the overall population status. Early-succession wildlife habitat has declined throughout much of the eastern U.S., mostly from forest maturation, declines in farm abandonment, drainage and conversion of bottomland hardwoods to agriculture and pine plantations, fire suppression, and urbanization.

Forestlands are maturing because disturbance factors such as fire have been suppressed and negative societal attitudes towards active forest management have received much attention. In addition, there has been an increase in the number of small (< 100 acre) forest tracts that have non-industrial private owners, who are less likely to harvest timber. Public misconceptions about forest management have fostered the belief that wildlife species that inhabit mature forests are imperiled. In many cases, the exact opposite is true. For example, in the Northeast U.S., most woodland breeding bird species have increasing population trends, whereas almost half of all successional/shrub species are declining (USGS Breeding Bird Survey).

What Needs To Be Done?

In the absence of natural disturbances habitat managers must simulate those factors in order to conserve species that depend on early-successional habitat. Without management programs to create patches of young forest, species that are associated with them will continue to decline and eventually disappear. Interestingly, there is increasing evidence that species typically considered to be associated only with mature forest will seek out food and cover resources provided by early succession habitats, especially during the juvenile stage. Therefore, the challenge is to protect, create, or restore an appropriate mix of young and old forest.

Proper habitat management for woodcock involves careful consideration of the juxtaposition of various covers that serve different purposes. For example, clearings (≥ 0.5 acre) provide singing-grounds for males. But it is critical that such clearings be placed near suitable nesting and brood-rearing cover consisting of young, second growth hardwoods. Creating feeding covers of dense shrubs and stands of young hardwoods on moist, rich soils is also important. Finally, nocturnal roosting areas consisting of old fields or recently harvested woodland of at least 3-5 acres should be located within 0.5 mile of suitable feeding cover. Active forest management programs in hardwood and mixed hardwood forests can provide all of these necessary components.

A landscape-level approach to woodcock management involves using management units of 500-1,000 acres, which should support approximately 500 woodcock. Ideally, several units should be located within 1-2 miles of each other to allow interchange of birds. Within management units, habitat treatments should be centered on broad-leaved deciduous, or deciduous shrub/scrub wetlands where moist soils are found. By locating (where allowable) treatments across wet areas or streams, suitable woodcock habitat will be created along a moisture gradient that will provide a consistent supply of earthworms throughout summer. Even-age forest management treatments of ≥ 5 acres in size will stimulate sprouting of shade-intolerant species such as aspen to create ideal woodcock habitat. Short rotation cutting cycles of no more than 20 years ensures that forested habitat will not become too mature and experience a decline in woodcock use.

Clearcuts in hardwood forest (left) provide singing-grounds for male woodcock, as well as nocturnal roosting sites. Hardwood regeneration that follows (right) provides high stem densities that offer feeding cover for woodcock. Clearcuts should be located near suitable nesting and brood cover.

CHAPTER 2: WOODCOCK POPULATION AND HABITAT GOALS

Analytical Approach

Woodcock Population Goals

We used a deficit approach to deriving population and habitat goals. Average woodcock densities (singing males/acre) were estimated for the periods 1970-75 and 2000-2004 for each Bird Conservation Region (BCR; Fig. 4), or portion of BCR, covered by the Singing-ground Survey. For each time period, the total number of singing males in each BCR was determined by multiplying the density estimate by the total land base acreage in the BCR. The *effective density* of singing males in each time period was determined by dividing the number of singing males by the number of manageable acres found in the BCR during that time period. We defined manageable acres as all timberland as determined by the USFS Forest Inventory.

We derived a woodcock *density deficit* by subtracting the current effective density from the historic effective density. The *population deficit* is the number of singing males that need to be added to a given BCR to achieve the effective density observed during 1970-75. The population deficit was calculated by multiplying the density deficit by the current number of manageable acres. A sample calculation of population and habitat goals is presented in Appendix 2.

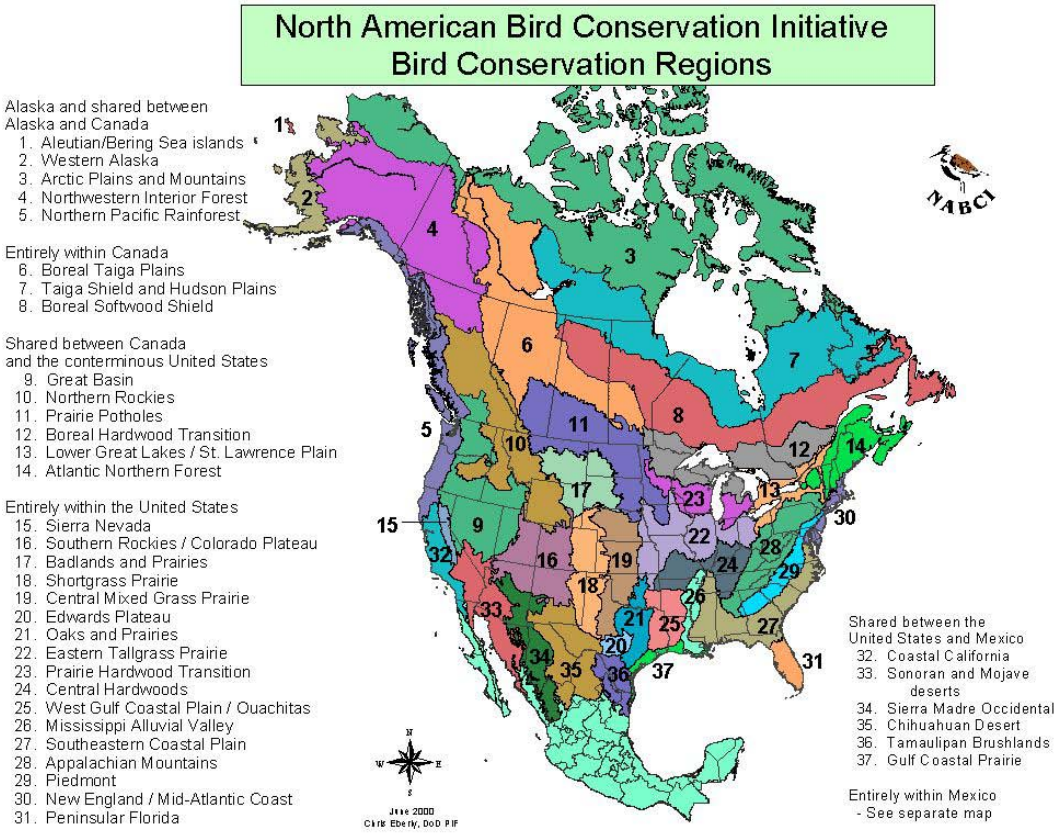

Fig. 4. Bird Conservation Regions in North America.

Woodcock Breeding Habitat Goals

Knowledge of population deficits was used to determine breeding habitat goals for each BCR. Habitat goals are the additional acres of woodcock habitat in a given breeding BCR that must be created to produce sufficient birds such that the effective density of singing males will equal those found during 1970-75. We identified woodcock habitat as being small diameter (seedling/sapling) and non-stocked forest inventory categories (Cushwa et al. 1977; Gutzwiller et al. 1982).

First, we needed to develop a habitat multiplier to determine how many acres of new habitat would be needed to add one singing male to the BCR. For each BCR, we calculated a habitat multiplier by dividing the acreage of early successional habitat (small diameter and non-stocked forest) for the 1970-75 period by the number of singing males found in the BCR during the same period. Acreage goals were calculated for each BCR by multiplying the population deficit by the habitat multiplier specific to that BCR.

There has been a loss of over 839,000 singing male woodcock since the early 1970s (Table 1). This corresponds to a population density deficit of just over 778,000 males. Approximately 27.8 million acres of new woodcock habitat needs to be created in order to eliminate this deficit and return woodcock densities to those observed during the early 1970s (Table 1).

Habitat management should focus primarily on forest types that are potentially valuable woodcock habitat, but that currently contain no woodcock due to forest succession. This constitutes creation of *new* habitat because it concentrates on areas that once contained woodcock but no longer do. Management of habitats that currently contain woodcock will obviously be part of the conservation effort. However, this could be better described as habitat enhancement rather than habitat creation. We have no information to guide us on how to quantitatively predict woodcock response to enhancement and therefore we did not include it in goal calculations. Recommended techniques for managing woodcock breeding habitat are provided by Sepik et al. (1981).

Woodcock Wintering Habitat Goals

A significant portion of the woodcock's migration and wintering range is not covered by the SGS. Although woodcock nesting occurs in southern areas of the U.S., the primary importance of this region is providing wintering habitat. Without density estimates for southern areas, development of population and habitat goals was not possible using the same deficit approach that was used for breeding areas. Instead, action plans for southern BCRs will focus on documentation of habitat losses, description of current habitat composition, and identification of areas where current and potential woodcock habitat (manageable acres) exists. Recommended habitat management techniques in wintering areas are provided by Krementz and Jackson (1999).

Detailed accounts of habitat and woodcock population changes and management recommendations for BCRs throughout the species range are provided in the following chapters.

Table 1. Changes in the population of singing male American woodcock (1970s vs. present), population density deficits, and habitat goals for returning woodcock densities to those observed during the 1970s.

BCR	State/Province	Population of singing males		Loss/gain of singing males (-/+)	Population density deficit (males)	Habitat goal (acres)
		Historical	Current			
11	MN	41,773	33,337	- 8,436	1,126	3,999
12	MI	407,260	304,934	- 102,325	35,077	350,770
	MN	182,669	156,067	- 26,602	7,344	73,440
	WI	108,141	79,712	- 28,429	32,067	320,670
	Sub-total U.S.	698,070	540,714	- 157,356	74,488	744,880
	MB	63,064	21,609	- 41,455	Not calculated	Not calculated
	ON	491,666	381,358	- 110,308	126,537	1,265,370
	PQ	58,347	58,276	- 71	139	1,390
	Sub-total Canada	613,077	461,243	- 151,834	126,676	1,266,760
	Total BCR	1,311,147	1,001,957	- 309,191	201,164	2,011,640
13	NY	97,888	62,239	- 35,649	37,184	1,148,242
	OH	25,413	13,276	- 12,137	10,855	193,219
	PA	12,831	7,882	- 4,948	5,423	158,623
	VT	6,344	4,363	- 1,981	1,305	20,410
	Sub-total U.S.	142,477	87,760	- 54,716	54,767	1,520,494
	ON	193,746	149,638	- 44,108	48,767	1,350,846
	PQ	46,318	46,184	- 134	7,273	201,462
	Sub-total Canada	240,064	195,822	- 44,242	56,040	1,552,308
	Total BCR	382,541	283,583	- 98,958	110,807	3,072,802
14	CT	2,349	896	- 1,453	1,520	55,527
	ME	168,170	108,952	- 59,219	62,358	1,912,514
	MA	4,445	2,393	- 2,052	1,996	74,827
	NH	29,505	21,970	- 7,535	7,493	268,986
	NY	43,741	28,230	- 15,512	14,000	481,465
	VT	27,906	20,582	- 7,324	8,702	394,122
	Sub-total U.S.	276,117	183,023	- 93,094	96,069	3,187,441

14	NB	181,679	142,681	- 38,997	44,191	525,426
	NS	67,372	52,373	- 14,999	14,129	179,157
	PEI	10,973	6,799	- 4,173	3,105	35,116
	PQ	101,344	99,329	- 2,015	5,596	78,904
	Sub-total Canada	361,368	301,182	- 60,186	67,021	818,603
	Total BCR	637,484	484,205	- 153,280	163,090	4,006,044
22	IL	18,495	32,302	+13,807	0	0
	IN	19,273	9,998	- 9,275	14,206	267,633
	MI	4,037	2,978	- 1,059	1,859	35,025
	MN	3,536	3,074	- 462	754	14,210
	OH	26,166	14,409	- 11,757	21,112	397,747
	Total BCR	71,506	62,761	- 8,745	37,931	714,615
23	IL	599	481	- 118	271	33,851
	IN	8,012	4,502	- 3,510	3,921	490,133
	MI	134,278	99,832	- 34,446	35,077	4,384,668
	MN	48,226	42,781	- 5,445	7,344	917,973
	WI	114,890	84,519	- 30,371	32,067	4,008,333
	Total BCR	306,005	232,114	- 73,891	80,617	10,077,103
24	IL	3,697	6,971	+ 3,273	0	0
	IN	11,715	4,716	- 6,999	8,043	509,126
	OH	443	211	- 232	0	0
	Total BCR	15,856	11,977	- 3,878	8,043	509,126
26	IL	121	292	+ 172	0	0
27	VA	8,189	2,186	- 6,003	5,355	496,951
28	MD	2,518	1,099	- 1,419	892	30,315
	NJ	5,048	1,176	- 3,871	3,549	120,663
	NY	38,704	22,817	- 15,888	17,744	603,293
	OH	17,540	8,741	- 8,799	10,005	340,169
	PA	71,497	42,030	- 29,466	30,414	1,034,059

	VA	13,068	4,284	- 8,784	9,306	316,389
	WV	31,120	13,898	- 17,222	16,276	553,368
	Total BCR	179,495	94,047	- 85,448	88,186	2,998,256
29	MD	4,158	1,308	- 2,850	2,850	133,950
	NJ	5,243	909	- 4,334	4,334	203,698
	PA	8,111	2,439	- 5,672	5,672	266,584
	VA	20,188	5,499	- 14,689	14,689	690,383
	Total BCR	37,700	10,156	- 27,544	27,545	1,294,615
30	CT	10,261	3,388	- 6,873	5,872	283,020
	DE	5,199	1,377	- 3,822	3,699	178,287
	ME	6,006	3,906	- 2,100	1,956	94,299
	MD	13,427	3,738	- 9,689	7,496	361,291
	MA	6,006	3,906	- 2,100	9,536	459,628
	NH	4,321	3,090	- 1,230	759	36,597
	NJ	20,651	2,983	- 17,668	17,198	828,948
	NY	7,908	2,707	- 5,201	3,372	162,533
	RI	3,765	1,302	- 2,464	1,934	93,204
	VA	3,979	1,079	- 2,899	2,507	120,858
	Total BCR	99,722	35,661	- 64,061	54,329	2,618,665
All	All	3,091,539	2,252,276	839,263	778,193	27,803,816

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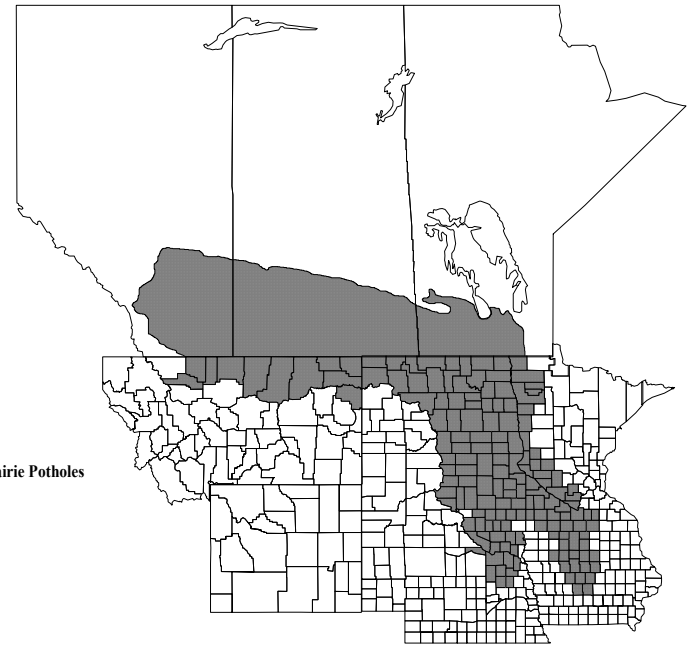
Bird Conservation Region 11: Prairie Potholes

Affected states/provinces: Minnesota, Iowa, North Dakota, South Dakota, Nebraska, Manitoba, Saskatchewan, and Alberta

Current area of timberland: 1,642,049 acres (378,882 acres of small diameter and non-stocked timberland)

Woodcock trend estimate (% change/year)	1968-2004:	0.9	Woodcock population estimate (singing males only; includes only Minnesota and Manitoba)	1970:	84,774
	1994-2004:	9.2		2004:	47,228



Physiography and Habitat Description

BCR 11 includes the western limit of the woodcock's breeding range in the Central Region. The full extent of the BCR extends beyond the Central Region into Montana and northward to Alberta. The portions of the BCR in Minnesota, Iowa, eastern portions of the Dakotas and northeast Nebraska are contained in sections 251A (Red River Valley) and 251B (North-Central Glaciated Plains) of the Prairie Parkland Temperate Province (McNab and Avers 1994). The Red River drains an area of prominent alluvial fans, whereas other areas are level to rolling till plains. Most wetlands have been drained for agricultural purposes. Central portions of the BCR are contained in sections 332A (Northeastern Glaciated Plains), 332B (Western Glaciated Plains), and 332 D (North-Central Great Plains) of the Great Plains Steppe Province (McNab and Avers 1994). Western portions of the BCR are contained in section 331E (Northern Glaciated Plains) of the Great Plains-Palouse Dry Steppe Province (McNab and Avers 1994). These areas include gently undulating to rolling continental glacial till plains with areas of kettle holes, kames, and moraines. Dryland farming and grazing occur on most of the area.

Between the current and baseline forest inventories there has been a net gain of approximately 371,000 acres (+ 23 %) of forestland in the U.S. portion of this BCR (Table 1). Included in this increase is a net gain of nearly 53,000 acres (+ 16%) of small diameter and non-stocked forest. We were not able to obtain historical forest inventory data for the Manitoba portion of the BCR that is covered by the Singing-ground Survey. Because Saskatchewan and Alberta are largely outside the primary range of woodcock we chose not to analyze habitat data for those portions of the BCR.

Major forest types in the U.S. portion of this BCR include paper birch (22%), red maple upland (12%), bur oak (11%), sugar maple/beech/yellow birch (6%) and oak hickory (5%; Tables 2 and 3). Stand-size class distribution and physiographic classes of the major forest types are contained in Tables 4 and 5, respectively. Approximately 84% of the

17.5 million acres of forestland in the region is under private ownership. Slightly over 18% is state or county forest, and national forest comprises nearly 7% of all forestland (Table 6).

Woodcock Harvest and Population Status

Much of BCR 11 is a transitional area between the grasslands of the prairie region and the northern hardwoods of the Great Lakes region. Because Minnesota and Manitoba comprise the majority of the land area within the primary range of woodcock within the BCR, they account for the bulk of woodcock harvest and hunter numbers. Estimates from the Harvest Information Program indicate that 12,000 hunters in Minnesota harvested approximately 42,200 birds throughout the state in 2005 (Kelley and Rau 2006). It is likely that the portion of this harvest that occurred in BCR 11 is relatively small compared to harvest in the central and eastern portions of the state.

The only portions of BCR 11 covered by the Singing-ground Survey are a small portion of Manitoba and all of Minnesota. The long-term trend estimate for woodcock in the surveyed portion of the BCR is 0.9 %/year, although this estimate is likely non-significant (USGS unpublished data). The total estimate of singing males in the surveyed areas within the BCR has declined from 84,734 during the early 1970s, to the current estimate of 47,228 birds (Table 7). The magnitude of this decline is inconsistent with the estimated trend for the population in this BCR. Manitoba accounted for a large portion of this decline; however, because it is at the fringe of the surveyed area we are not confident in the accuracy of this result. This fact, combined with the lack of historical forest inventory data for Manitoba forced development of population and habitat goals to be restricted to the Minnesota portion of the BCR.

The total estimate of singing males in the Minnesota portion of the BCR has declined from 41,733 during the early 1970s, to the current estimate of 33,337 birds (Table 7). The total woodcock population deficit for the Minnesota portion of the BCR is just over 1,100 singing males (Table 7). The population deficit is much lower than the actual loss of singing males. This is due to the fact that the density of singing males on manageable acres for the 2 time periods were fairly comparable (Table 7).

Habitat Goals

To restore woodcock densities in the Minnesota portion of BCR 11 to those observed during the early 1970s, a total of just over 1,100 additional singing males need to be added to the population (Table 7). It should be pointed out that this estimate pertains only to manageable acres in the Minnesota portion of the BCR. Achieving this goal will require the creation of 4,000 acres of new woodcock habitat in Minnesota (Table 7). However, if the management goal is to replace the total loss of singing males that has occurred since the early 1970s (without regard to density) then approximately 30,000 acres of new woodcock habitat needs to be created in the Minnesota portion of BCR 11. This assumes that approximately 3.6 acres of new habitat will add one singing male to the population.

In this region the vast majority of timberland is under private ownership. Therefore, state and federal resource agencies will need to enlist the help of individual and commercial private forestland owners in order to achieve habitat management goals. A large percentage of timberland in the Minnesota portion of the BCR is comprised of aspen. Therefore, traditional even-age forest management can be utilized to create early succession habitat for woodcock.

Table 1. Current and historic (ca. 1970-75) stand-size distribution of timberland in the U.S. portion of Bird Conservation Region (BCR) 11 and portions of individual states within the BCR.

	Current stand-size distribution in acres						Historic stand-size distribution in acres				
Area	Total forestland[1]	Large diameter[2,3]	Medium diameter[2,4]	Small diameter[2,5]	Non-stocked[2,6]		Total forestland[1]	Large diameter[2,3]	Medium diameter[2,4]	Small diameter[2,5]	Non-stocked[2,6]
Minnesota	519,679 (36.9)	202,938 (39.1)	186,072 (35.8)	126,953 (24.4)	3,716 (0.7)		629,900 (38.4)	202,100 (32.1)	279,400 (44.4)	148,400 (23.6)	0 (0.0)
Iowa	219,896 (15.6)	148,476 (67.5)	63,844 (29.0)	2,904 (1.3)	4,674 (2.1)		125,100 (9.8)	58,362 (46.7)	33,475 (26.8)	30,847 (24.7)	2,416 (1.9)
North Dakota	414,165 (29.4)	184,118 (44.5)	126,669 (30.6)	91,169 (22.0)	12,209 (2.9)		308,767 (24.3)	92,386 (29.9)	136,221 (44.1)	71,021 (23.0)	9,139 (3.0)
South Dakota	103,167 (7.3)	43,988 (42.6)	39,865 (38.6)	12,876 (12.5)	6,438 (6.2)		50,960 (4.0)	21,387 (42.0)	12,531 (24.6)	10,335 (20.3)	6,707 (13.2)
Nebraska	149,996 (10.7)	65,211 (43.5)	53,300 (35.5)	28,530 (19.0)	2,956 (2.0)		37,100 (2.9)	20,200 (54.4)	13,500 (36.4)	3,400 (9.2)	0 (0.0)
Total BCR	1,406,903 (100.0)	644,731 (45.8)	469,750 (33.4)	262,431 (18.7)	29,992 (2.1)		1,151,827 (100.0)	394,435 (34.2)	475,127 (41.2)	264,003 (22.9)	18,262 (1.6)

[1] Percentages in parentheses. Percentages for total forestland refer to percent of column total.
[2] Percentages for various diameter categories and non-stocked category refer to percent of total forestland for current and historic time periods within each state.
[3] Softwoods at least 9 inches, and hardwoods at least 11 inches in diameter at breast height.
[4] Trees at least 5 inches in diameter at breast height, but smaller than large diameter.
[5] Saplings 1-5 inches diameter at breast height, plus softwood seedlings more than 6 inches tall and hardwood seedlings more than 12 inches tall.
[6] Commercial forest land on which stocking of trees is less than 16.7 percent.

Table 2. Percent occurrence of forest types between states within the U.S. portion of BCR 11.

Forest Type	MN	IA	ND	SD	NE	Total
Aspen	68.0	0.0	32.0	0.0	0.0	100.0
Elm / ash / locust	18.1	1.3	67.7	8.7	4.2	100.0
Sugarberry / hackberry / elm / green ash	21.2	12.0	43.6	13.3	9.9	100.0
Mixed upland hardwoods	14.5	27.4	29.6	8.6	19.9	100.0
Bur oak	28.4	8.1	36.1	9.4	18.0	100.0
Cottonwood	23.0	11.4	55.7	0.0	9.9	100.0
Hard maple / basswood	67.7	12.3	20.0	0.0	0.0	100.0
White oak / red oak / hickory	1.9	98.1	0.0	0.0	0.0	100.0
Sugar maple / beech / yellow birch	100.0	0.0	0.0	0.0	0.0	100.0
Silver maple / American elm	100.0	0.0	0.0	0.0	0.0	100.0
Eastern redcedar	0.0	0.0	0.0	0.0	100.0	100.0
Non stocked	13.7	17.3	45.2	23.8	0.0	100.0
Balsam poplar	77.3	0.0	22.7	0.0	0.0	100.0
Eastern redcedar / hardwood	0.0	100.0	0.0	0.0	0.0	100.0
Red maple / upland	0.0	0.0	0.0	0.0	100.0	100.0
White oak	1.0	99.0	0.0	0.0	0.0	100.0
Other exotic hardwoods	23.2	0.0	0.0	76.8	0.0	100.0
Black ash / American elm / red maple	46.6	14.3	39.1	0.0	0.0	100.0
Willow	100.0	0.0	0.0	0.0	0.0	100.0
River birch / sycamore	0.0	100.0	0.0	0.0	0.0	100.0

Table 3. Forest composition of timberland within the U.S. portion of BCR 11 (acres; percent of column total in parentheses).

Forest Type	MN	IA	ND	SD	NE	Total
Aspen	230,036 (44.3)	0 (0.0)	108,272 (19.8)	0 (0.0)	0 (0.0)	338,308 (22.0)
Elm / ash / locust	41,196 (7.9)	2,904 (1.3)	154,314 (28.2)	19,897 (19.3)	9,644 (6.4)	227,954 (14.8)
Sugarberry / hackberry / elm / green ash	46,946 (9.0)	26,667 (12.1)	96,606 (17.7)	29,450 (28.5)	21,896 (14.6)	221,566 (14.4)
Mixed upland hardwoods	21,047 (4.0)	39,734 (18.1)	42,959 (7.8)	12,450 (12.1)	28,806 (19.2)	144,995 (9.4)
Bur oak	34,472 (6.6)	9,792 (4.5)	43,822 (8.0)	11,407 (11.1)	21,788 (14.5)	121,281 (7.9)
Cottonwood	22,437 (4.3)	11,061 (5.0)	54,288 (9.9)	0 (0.0)	9,644 (6.4)	97,429 (6.3)
Hard maple / basswood	42,268 (8.1)	7,709 (3.5)	12,471 (2.3)	0 (0.0)	0 (0.0)	62,449 (4.1)
White oak / red oak / hickory	929 (0.2)	47,549 (21.6)	0 (0.0)	0 (0.0)	0 (0.0)	48,478 (3.1)
Sugar maple / beech / yellow birch	16,058 (3.1)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	16,058 (2.4)
Silver maple / American elm	12,999 (2.5)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	12,999 (2.2)
Eastern redcedar	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	26,536 (17.7)	26,536 (2.2)
Non stocked	3,716 (0.7)	4,674 (2.1)	12,209 (2.2)	6,438 (6.2)	0 (0.0)	27,036 (1.8)
Balsam poplar	20,905 (4.0)	0 (0.0)	6,123 (1.1)	0 (0.0)	0 (0.0)	27,028 (1.8)
Eastern redcedar / hardwood	0 (0.0)	4,997 (2.3)	0 (0.0)	0 (0.0)	0 (0.0)	4,997 (1.7)
Red maple / upland	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	11,824 (7.9)	11,824 (0.8)
White oak	116 (<0.1)	11,638 (5.3)	0 (0.0)	0 (0.0)	0 (0.0)	11,755 (0.8)
Other exotic hardwoods	1,681 (0.3)	0 (0.0)	0 (0.0)	5,574 (5.4)	0 (0.0)	7,255 (0.7)
Black ash / American elm / red maple	4,265 (0.8)	1,312 (0.6)	3,578 (0.7)	0 (0.0)	0 (0.0)	9,155 (0.6)
Willow	827 (0.2)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	827 (0.6)
River birch / sycamore	0 (0.0)	6,816 (3.1)	0 (0.0)	0 (0.0)	0 (0.0)	6,816 (0.4)
Other	19,781 (3.8)	45,044 (20.5)	12,664 (2.3)	17,951 (17.4)	19,858 (13.2)	33,568 (2.2)

Table 4. Stand size class[1] composition (in thousands of acres) of the most common forest types found in states within the U.S. portion of BCR 11.

	Forest Type																			
Stand size class	Aspen	Elm / ash / locust	Sugarberry / hackberry / elm / green ash	Mixed upland hardwoods	Bur oak	Cottonwood	Hard maple / basswood	White oak / red oak / hickory	Sugar maple / beech / yellow birch	Silver maple / American elm	Eastern redcedar	Non stocked	Balsam poplar	Eastern redcedar / hardwood	Red maple / upland	White oak	Other exotic hardwoods	Black ash / American elm / red maple	Willow	River birch / sycamore	All forest types
Minnesota																					
Large	10.1	27.2	30.4	10.4	27.9	22.4	40.5	0.0	13.3	13.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	202.9
Medium	113.1	13.1	12.8	10.6	6.6	0.0	1.8	0.9	0.0	0.0	0.0	0.0	13.3	5.0	0.0	0.0	0.0	3.3	0.0	0.0	186.1
Small	106.9	0.9	3.7	0.0	0.0	0.0	0.0	0.0	2.8	0.0	0.0	0.0	7.6	0.0	0.0	0.0	0.0	1.0	0.8	0.0	127.0
Iowa																					
Large	0.0	0.0	15.4	10.2	9.8	11.1	7.7	41.7	12.0	15.9	0.0	0.0	0.0	5.0	0.0	11.6	0.0	1.3	0.0	6.8	148.5
Medium	0.0	0.0	11.3	29.6	0.0	0.0	0.0	5.9	9.5	4.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	63.8
Small	0.0	2.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.9
North Dakota																					
Large	27.9	43.9	46.9	6.2	17.4	20.5	12.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.7	0.0	184.1
Medium	45.9	41.0	8.1	21.0	2.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.1	0.0	0.0	0.0	0.0	1.9	0.0	0.0	126.7
Small	34.4	16.2	17.9	10.5	6.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.8	1.7	0.0	0.0	91.2
South Dakota																					
Large	0.0	1.9	24.5	6.0	0.0	0.0	0.0	0.0	0.0	0.0	6.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	44.0
Medium	0.0	11.5	4.9	6.4	11.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.6	0.0	0.0	0.0	39.9
Small	0.0	6.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.9
Nebraska																					
Large	0.0	0.0	9.9	19.2	14.4	9.6	9.6	0.0	0.0	0.0	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	65.2
Medium	0.0	0.0	1.6	9.6	7.4	0.0	0.0	0.0	0.0	0.0	18.0	0.0	0.0	4.8	0.0	0.0	0.0	0.0	0.0	0.0	53.3
Small	0.0	0.0	10.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.0	0.0	0.0	12.1	0.0	0.0	0.0	0.0	0.0	0.0	28.5
Total BCR																					
Large	38.0	73.1	127.1	51.9	69.4	63.6	70.3	41.7	25.3	28.9	9.1	0.0	0.0	5.0	0.0	11.8	0.0	1.3	7.7	6.8	644.7
Medium	159.0	65.6	38.7	77.2	28.1	0.0	1.8	6.8	9.5	4.4	18.0	0.0	19.5	9.8	0.0	0.0	5.6	5.2	0.0	0.0	469.7
Small	141.3	26.5	32.0	10.5	6.7	0.0	0.0	0.0	2.8	0.0	6.0	0.0	7.6	12.1	0.0	0.0	3.8	2.7	0.8	0.0	262.4

Large diameter trees: hardwoods at least 11 inches diameter, 9 inches for softwoods; size class has more than 50% of stocking in medium and large diameter trees, with stocking of large trees equal to or greater than medium diameter trees. **Medium diameter** trees: trees at least 5 inches diameter but not as large as large diameter trees; size class has more than 50% of stocking in medium and large diameter trees, with stocking of large diameter trees less than stocking of medium diameter trees. **Small diameter** trees: trees less than 5 inches diameter; size class has at least 50% of the stocking in small diameter trees.

Table 5. Physiographic class composition (in thousands of acres) of the most common forest types found in the U.S. portion of BCR 11.

	Forest Type																			
Physio-graphic class	Aspen	Elm / ash / locust	Sugarberry / hackberry / elm / green ash	Mixed upland hardwoods	Bur oak	Cottonwood	Hard maple / basswood	White oak / red oak / hickory	Sugar maple / beech / yellow birch	Silver maple / American elm	Eastern redcedar	Non stocked	Balsam poplar	Eastern redcedar / hardwood	Red maple / upland	White oak	Other exotic hardwoods	Black ash / American elm / red maple	Willow	River birch / sycamore	All forest types
Dry tops	0.0	6.6	0.0	0.0	0.0	0.0	2.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.3
Dry slopes	0.0	9.1	0.0	25.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	41.0
Deep sands	0.0	0.0	0.0	0.0	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.6	0.0	0.0	0.0	0.0	0.0	0.0	6.4
Other xeric	3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.5
Flatwoods	213.4	59.9	33.4	28.8	25.2	10.7	5.0	7.6	3.7	0.0	0.0	7.6	13.6	0.0	0.0	0.0	5.6	1.0	0.0	0.0	420.3
Rolling uplands	96.2	80.5	22.8	60.7	56.3	0.0	40.1	35.9	16.7	3.5	15.1	12.2	6.1	22.3	0.0	11.8	5.4	4.9	0.0	6.8	501.9
Moist slopes and coves	0.0	4.9	0.0	4.2	4.8	0.0	3.5	0.0	6.1	0.0	9.0	0.0	3.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	35.8
Narrow floodplains/ bottomlands	2.3	0.0	68.3	0.0	6.2	25.8	0.0	0.0	0.0	26.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.6	0.0	140.9
Broad floodplains/ bottomlands	3.1	0.0	52.5	4.5	0.0	18.7	0.0	0.0	0.0	3.0	9.0	6.4	0.0	0.0	0.0	0.0	0.0	3.0	1.9	0.0	102.1
Other mesic	17.1	15.8	3.7	16.0	9.9	8.4	20.7	5.0	11.1	0.0	0.0	0.0	4.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	111.9
Swamps/bogs	2.8	0.0	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.6
Small drains	0.0	0.0	14.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	15.1
Bays and wet pocosins	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Beaver ponds	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cypress ponds	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other hydric	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.3
Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.7

Table 6. Forest ownership categories in the U.S. portion of BCR 11 (acres; percent of column total in parentheses).

Ownership	Total BCR	MN	IA	ND	SD	NE
National Forest	7,038 (0.5)	728 (0.1)	0 (0.0)	6,309 (1.5)	0 (0.0)	0 (0.0)
National Park Service	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
U.S. Fish and Wildlife Service	33,320 (2.4)	6,574 (1.3)	0 (0.0)	20,309 (4.9)	6,438 (6.2)	0 (0.0)
Department of Defense	3,717 (0.3)	0 (0.0)	3,717 (1.7)	0 (0.0)	0 (0.0)	0 (0.0)
Other Federal	39,072 (2.8)	0.0 (0.0)	14,550 (6.6)	14,878 (3.6)	0 (0.0)	9,644 (6.4)
State	146,293 (10.4)	77,550 (14.9)	24,884 (10.3)	43,859 (10.6)	0 (0.0)	0 (0.0)
County/Municipal	21,650 (1.5)	6,836 (1.3)	9,087 (4.1)	5,728 (1.4)	0 (0.0)	6,141 (1.6)
Other Local Government	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Private	1,155,813 (82.2)	427,992 (82.4)	167,659 (76.2)	323,081 (78.0)	96,729 (93.8)	140,353 (93.6)
All ownerships	1,406,903 (100.0)	519,679 (100.0)	219,896 (100.0)	414,165 (100.0)	103,167 (100.0)	149,996 (100.0)

Table 7. Calculation of population deficits and habitat goals for American woodcock in the Minnesota portion of Bird Conservation Region 11.

	Historical[1]		Current
Total land area (acres)			
Minnesota	17,603,168		17,603,168
Manageable acres			
Minnesota	629,900		519,679
Population of singing males			
Minnesota	41,733		33,337
Population deficit (singing males)[2]			
Minnesota		1,126	
Habitat goal (acres)[2,3]			
Minnesota		4,000	

[1] Historical time period refers to ca. 1970-75.

[2] Population deficit and habitat goal pertains only to the Minnesota portion of the BCR due to lack of historical forest inventory data for Manitoba.

[3] Habitat goal was calculated as the population deficit multiplied by the number of acres of early succession habitat (Table 1) per singing male observed in the 1970-75 time period (3.55 acres ESH/singing male).

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Web citation: Miles, Patrick D. Aug-18-2004. Forest inventory mapmaker web-application version 1.7. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Research Station. [Available only on internet: www.ncrs2.fs.fed.us/4801/fiadb/index.htm]

Bird Conservation Region 12: Boreal Hardwood Transition

Affected Jurisdictions: Manitoba, Michigan, Minnesota, Ontario, Quebec, Wisconsin

Current Area of Forestland: 77,619,282 acres (14,624,100 acres of small-diameter and non-stocked forestland)

Woodcock Trend Estimate (% change per year)	1968-2004: 0.1 1995-2004: 0.8
Woodcock Population Estimate (singing males only)	1970: 1,311,147 2004: 1,001,957

Physiography and Habitat Description

The Boreal Hardwood Transition Bird Conservation Region (BCR 12) is, as the name implies, a transitional zone where the predominantly coniferous forests of northern latitudes intermix with the predominantly deciduous forests of southern latitudes. Landforms are typically flat to gently rolling. Wetlands and lakes of various sizes are interspersed across the landscape. Upland soils are quite variable with relatively nutrient-poor sands common on level xeric sites and deep nutrient-rich loams characteristic of mesic sites.

Predominant forest types include pine, spruce-fir, maple-beech-birch, and aspen-birch. Since 1970, the area of maple-beech-birch forest has increased commensurate with a slight loss of aspen-birch forest, although this rate of change varies by jurisdiction. The relatively high proportion of aspen-birch forest within BCR 12 provides abundant opportunities to sustain quality woodcock habitats.

Between the current and baseline forest inventories the total area of forest has increased by approximately 3,775,000 acres (5.1%). In addition, small-diameter forest has increased by approximately 1,431,800 acres (10.8%). This increase in small-diameter forest is largely a result of extensive forest management on public and industrial forests in Minnesota, Ontario and Quebec, primarily in the spruce-fir and aspen-birch forest types.

Within the United States portion of BCR 12, 50.7% of the forest is in private ownership and the remainder in public ownership. Crown (public) lands are common throughout the Canadian portions of BCR 12 although these data are unavailable at the BCR level.

Woodcock Harvest and Population Status

Woodcock breeding densities are typically higher in BCR 12 than in any other BCR. Singing-ground survey data document long-term declines in breeding woodcock populations within all of the jurisdictions in BCR 12. These declines range from 1% per year in Minnesota, to 1.9% per year in Ontario and Wisconsin (Kelley and Rau 2006).

Estimates from the Harvest Information Program indicate that the states of Michigan, Minnesota and Wisconsin support 28,000, 12,000, and 16,000 active woodcock hunters, respectively. Combined, these states account for 54.6% of the woodcock hunting days in the United States. These hunters harvest approximately 107,000, 42,000, and 38,000 woodcock in Michigan, Minnesota, and Wisconsin, respectively (Kelley and Rau 2006).

Population and Habitat Goals

To restore woodcock population densities in BCR 12 to those observed during the 1970s, a total of approximately 201,100 additional singing males need to be added to the population. Achieving this goal will require the establishment of approximately 2,011,000 acres of new woodcock habitat in addition to that typically being maintained on the landscape.

Habitat Management Recommendations

Sustaining aspen-birch forest communities through traditional clearcut regeneration treatments is the single highest priority management recommendation to restore woodcock population densities to 1970s levels. Unfortunately, most public agencies are reducing aspen management goals largely in response to concerns voiced by some publics regarding the aesthetics of clearcut treatments. The woodcock population restoration goal outlined here will likely not be met if these reductions in aspen regeneration treatments continue.

In addition, guidelines affecting the management of forested riparian areas are increasingly proscriptive with regard to the removal of overstory vegetation through active forest management. Such guidelines complicate efforts to establish small-diameter forest habitats on moist soil sites where earthworms are available to foraging woodcock; habitats that are extremely important to woodcock in BCR 12.

Riparian areas unquestionably warrant special consideration during the planning and implementation of active forest management. However, small-diameter forest and shrubland habitats in riparian areas are critical to woodcock and other wildlife and should be incorporated as a component of riparian area management. The potential negative impacts of management activities can be mitigated by the use of light-on-the-land harvest equipment and timing activities to coincide with frozen-ground conditions where applicable.

Table 1a. Current and historical (ca. 1970-75) stand-size distribution of timberland in the U.S. portion of BCR 12 and portions of individual states within the BCR.

Area	Current stand-size distribution (acres)					Historical stand-size distribution (acres)				
	Total timberland[1]	Large diameter[2,3]	Medium diameter[2,4]	Small diameter[2,5]	Non-stocked[2,6]	Total timberland[1]	Large diameter[2,3]	Medium diameter[2,4]	Small diameter[2,5]	Non-stocked[2,6]
Minnesota	11,882,889	2,674,379	4,732,696	4,319,526	156,289	8,581,900	1,906,600	4,535,700	2,099,700	39,900
	(34.6)	(22.5)	(39.8)	(36.4)	(1.3)	(27.6)	(22.2)	(52.9)	(24.5)	(0.5)
Wisconsin	8,027,509	2,358,438	3,585,364	2,020,144	63,562	7,569,200	1,046,000	3,938,300	2,432,000	152,900
	(23.3)	(29.4)	(44.7)	(25.2)	(0.8)	(24.4)	(13.8)	(52.0)	(32.1)	(2.0)
Michigan	14,472,184	5,301,229	6,137,576	2,928,151	105,227	14,928,400	3,607,050	6,929,650	4,129,750	261,850
	(42.1)	(36.6)	(42.4)	(20.2)	(0.7)	(48.0)	(24.2)	(46.4)	(27.7)	(1.8)
U.S. sub-total of BCR	34,382,582	10,334,046	14,455,636	9,267,821	325,079	31,079,500	6,559,650	15,403,650	8,661,450	454,650
	(100.0)	(30.1)	(33.8)	(27.0)	(0.9)	(100.0)	(21.1)	(49.6)	(27.9)	(1.5)

[1] Percentages in parentheses. Percentages for total timberland refer to percent of column total.
[2] Percentages for various diameter categories and non-stocked category refer to percent of total forestland for current and historic time periods within each state.
[3] Softwoods at least 9 inches, and hardwoods at least 11 inches in diameter at breast height; size class has more than 50% of stocking in medium and large diameter trees, with stocking of large trees equal to or greater than medium diameter trees.
[4] Trees at least 5 inches in diameter at breast height, but smaller than large diameter; size class has more than 50% of stocking in medium and large diameter trees, with stocking of large diameter trees less than stocking of medium diameter trees .
[5] Saplings 1-5 inches diameter at breast height, plus softwood seedlings more than 6 inches tall and hardwood seedlings more than 12 inches tall; size class has at least 50% of the stocking in small diameter trees.
[6] Commercial forest land on which stocking of trees is less than 16.7 percent.

Table 1b. Current and historical (ca. 1980) stand-size distribution of timberland in the Canadian portion of BCR 12 and portions of individual provinces within the BCR.

Area	Current stand-size distribution (acres)			Historical stand-size distribution (acres)		
	Total timberland[1]	Large diameter[2,3]	Small diameter[2,4]	Total timberland[1]	Large diameter[2,3]	Small diameter[2,4]
Ontario	13,688,400	12,306,200	1,382,200	13,251,000	12,204,200	1,046,800
	(31.7)	(89.9)	(10.1)	(31.0)	(92.1)	(7.9)
Quebec	29,548,300	25,889,300	3,649,000	29,513,700	26,484,300	3,029,400
	(68.3)	(87.6)	(12.3)	(69.0)	(89.7)	(10.3)
Canada sub-total of BCR	43,236,700	38,195,500	5,031,200	42,764,700	38,688,500	4,076,200
	(100.0)	(88.3)	(11.6)	(100.0)	(90.5)	(9.5)

[1] Percentages in parentheses. Percentages for total timberland refer to percent of column total.
[2] Percentages for various diameter categories and non-stocked category refer to percent of total forestland for current and historic time periods within each state.
[3] Stands of trees greater than 5 inches in diameter at breast height.
[4] Stands of trees less than or equal to 5 inches in diameter at breast height and non-stocked stands.

Table 2. Percent composition of forest types between states within BCR 12.

Forest Type	MN	WI	MI	Total
Aspen	49.2	25.3	25.5	100.0
Sugar maple / beech / yellow birch	7.1	27.4	65.4	100.0
Hard maple / basswood	19.5	37.7	42.8	100.0
Black spruce	63.1	14.5	22.5	100.0
Northern white-cedar	27.2	12.7	60.2	100.0
Paper birch	62.3	17.1	20.5	100.0
Black ash / American elm / red maple	45.6	26.2	28.2	100.0
Red pine	24.1	26.1	49.7	100.0
Tamarack	64.5	19.7	15.8	100.0
Jack pine	30.5	15.2	54.3	100.0
Red maple / upland	8.1	36.5	55.3	100.0
Balsam fir	40.3	18.6	41.1	100.0
Northern red oak	19.5	32.8	47.7	100.0
Balsam poplar	60.0	5.9	34.1	100.0
Other pine / hardwood	26.1	23.9	50.0	100.0
White oak / red oak / hickory	10.3	27.0	62.7	100.0
Eastern white pine	15.6	31.5	52.8	100.0
Non stocked	48.6	18.7	32.7	100.0
Post oak / blackjack oak	1.7	61.2	37.1	100.0
White spruce	30.3	16.7	53.0	100.0

Table 3. Forest composition of timberland within the U.S. portion of BCR 12 (acres; percent of column total in parentheses).

Forest Type	MN	WI	MI	Total
Aspen	4,179,437 (35.2)	2,146,938 (25.3)	2,170,855 (15.0)	8,497,230 (24.4)
Sugar maple / beech / yellow birch	382,772 (3.2)	1,472,533 (17.4)	3,513,886 (24.3)	5,369,191 (15.4)
Hard maple / basswood	488,177 (4.1)	941,763 (11.1)	1,070,458 (7.4)	2,500,398 (7.2)
Black spruce	1,342,163 (11.3)	307,860 (3.6)	478,575 (3.3)	2,128,597 (6.1)
Northern white-cedar	572,452 (4.8)	266,393 (3.1)	1,266,680 (8.8)	2,105,525 (6.0)
Paper birch	949,336 (8.0)	261,136 (3.1)	313,003 (2.2)	1,523,474 (4.4)
Black ash / American elm / red maple	684,089 (5.8)	391,981 (4.6)	422,846 (2.9)	1,498,916 (4.3)
Red pine	330,207 (2.8)	357,540 (4.2)	680,298 (4.7)	1,368,045 (3.9)
Tamarack	781,424 (6.6)	239,333 (2.8)	191,305 (1.3)	1,212,062 (3.5)
Jack pine	345,574 (2.9)	172,456 (2.0)	615,837 (4.3)	1,133,867 (3.3)
Red maple / upland	78,407 (0.7)	352,711 (4.2)	534,399 (3.7)	965,517 (2.8)
Balsam fir	366,076 (3.1)	169,077 (2.0)	372,919 (2.6)	908,071 (2.6)
Northern red oak	135,568 (1.1)	228,508 (2.7)	332,419 (2.3)	696,495 (2.0)
Balsam poplar	414,568 (3.5)	40,592 (0.5)	235,584 (1.6)	690,743 (2.0)
Other pine / hardwood	150,559 (1.3)	137,471 (1.6)	287,791 (2.0)	575,821 (1.7)
White oak / red oak / hickory	50,581 (0.4)	131,820 (1.6)	306,387 (2.1)	488,787 (1.4)
Eastern white pine	66,695 (0.6)	134,362 (1.6)	225,138 (1.6)	426,196 (1.2)
Non stocked	156,289 (1.3)	59,976 (0.7)	105,227 (0.7)	321,492 (0.9)
Post oak / blackjack oak	4,976 (<0.1)	178,073 (2.1)	108,086 (0.7)	291,134 (0.8)
White spruce	85,179 (0.7)	46,942 (0.6)	149,227 (1.0)	281,348 (0.8)

Table 4. Stand size class[1] composition (in thousands of acres) of the most common forest types found in states within BCR 12.

	Forest Type																			
Stand size class	Aspen	Sugar maple / beech / yellow birch	Hard maple / basswood	Black spruce	Northern white-cedar	Paper birch	Black ash / American elm / red maple	Red pine	Tamarack	Jack pine	Red maple / upland	Balsam fir	Northern red oak	Balsam poplar	Other pine / hardwood	White oak / red oak / hickory	Eastern white pine	Post oak / blackjack oak	White spruce	All forest types
Minnesota																				
Large	860.1	126.5	285.0	23.6	251.9	199.8	99.4	149.6	63.4	148.9	7.6	60.9	80.4	69.5	71.4	19.1	53.8	0.0	10.8	2,674.4
Medium	1,473.1	206.3	190.0	398.8	258.9	588.3	392.6	115.3	311.9	131.3	50.9	117.0	46.6	216.4	52.9	26.2	5.9	5.0	31.8	4,732.7
Small	1,846.2	50.0	13.2	919.7	61.6	161.2	192.1	65.2	406.1	65.4	20.0	188.2	8.5	128.7	26.3	5.3	7.0	0.0	42.6	4,319.5
Wisconsin																				
Large	254.9	643.4	458.8	15.0	125.1	28.3	36.4	235.6	8.1	25.5	73.8	9.2	134.4	9.5	40.1	64.1	107.8	51.6	16.9	2,492.4
Medium	902.4	741.3	450.2	83.7	134.2	195.6	284.8	87.0	108.2	96.7	253.4	59.7	73.5	17.6	27.4	49.1	15.5	68.7	18.9	3,790.6
Small	989.7	87.8	32.8	209.2	7.1	37.2	70.8	35.0	123.0	50.3	25.5	100.1	20.5	13.6	70.0	18.6	11.1	57.8	11.2	2,128.7
Michigan																				
Large	418.5	1,792.7	568.9	41.0	450.1	80.7	93.5	406.1	33.4	145.5	157.5	71.7	243.6	27.2	113.6	112.8	141.6	39.6	45.6	5,301.2
Medium	903.4	1,521.7	465.5	199.9	705.9	191.3	235.1	221.6	62.9	277.8	309.5	137.1	68.9	92.5	89.4	122.6	60.9	32.8	73.8	6,137.6
Small	849.0	199.5	36.0	237.6	110.6	41.0	94.3	52.6	95.0	192.6	67.5	164.1	20.0	115.9	84.8	71.1	22.6	35.7	29.9	2,928.2
Total BCR																				
Large	1,533.4	2,562.6	1,312.7	79.6	827.1	308.8	229.3	791.3	105.0	319.9	238.8	141.9	458.5	106.2	225.1	196.0	303.2	91.2	73.2	10,468.0
Medium	3,279.0	2,469.3	1,105.7	682.4	1,099.1	975.2	912.4	424.0	483.0	505.7	613.8	313.7	189.0	326.4	169.6	197.8	82.3	106.5	124.5	14,660.9
Small	3,684.8	337.3	82.0	1,366.6	179.3	239.4	357.2	152.8	624.1	308.3	112.9	452.5	49.0	258.1	181.1	94.9	40.7	93.5	83.6	9,376.4

Large diameter trees: hardwoods at least 11 inches diameter, 9 inches for softwoods; size class has more than 50% of stocking in medium and large diameter trees, with stocking of large trees equal to or greater than medium diameter trees. **Medium diameter** trees: trees at least 5 inches diameter but not as large as large diameter trees; size class has more than 50% of stocking in medium and large diameter trees, with stocking of large diameter trees less than stocking of medium diameter trees. **Small diameter** trees: trees less than 5 inches diameter; size class has at least 50% of the stocking in small diameter trees.

Table 5. Physiographic class composition (in thousands of acres) of the most common forest types found in states within BCR 12.

Physio-graphic class	Forest Type: Aspen	Sugar maple / beech / yellow birch	Hard maple / basswood	Black spruce	Northern white-cedar	Paper birch	Black ash / American elm / red maple	Red pine	Tamarack	Jack pine	Red maple / upland	Balsam fir	Northern red oak	Balsam poplar	Other pine / hardwood	White oak / red oak / hickory	Eastern white pine	Non stocked	Post oak / blackjack oak	White spruce	All forest types
Dry tops	37.4	6.4	12.3	3.4	2.4	6.0	0.0	9.8	2.6	9.0	0.0	2.7	9.1	7.5	6.6	0.0	11.1	0.9	0.0	3.3	144.4
Dry slopes	20.1	10.3	10.5	6.0	0.6	20.2	0.0	26.2	0.0	4.4	0.0	0.0	2.8	0.0	20.9	2.7	2.3	7.3	8.3	0.0	155.9
Deep sands	261.6	126.5	55.7	1.9	2.5	10.7	3.6	367.0	2.6	457.4	22.4	13.4	77.1	11.0	151.0	64.7	47.8	23.8	80.0	11.9	1,976.3
Other xeric	69.4	10.0	3.4	0.0	0.0	4.8	0.0	46.6	0.0	53.1	4.8	4.1	8.3	0.0	20.6	6.9	6.7	1.5	12.1	5.4	281.8
Flatwoods	3,602.0	2,016.3	692.5	118.6	203.4	323.9	224.9	451.0	48.8	279.2	565.5	252.0	142.2	309.1	139.7	196.3	177.0	71.1	79.8	112.9	10,575.4
Rolling uplands	3,031.3	2,859.8	1,588.1	61.0	87.5	758.4	50.7	399.2	5.3	192.2	303.3	184.2	427.6	64.9	178.1	197.1	124.0	32.9	92.6	89.1	11,176.2
Moist slopes and coves	118.7	86.2	15.1	9.5	36.0	37.9	14.7	7.5	0.0	7.3	9.7	16.6	2.4	12.1	3.5	0.0	5.6	0.0	0.0	2.2	402.4
Narrow floodplains/ bottomlands	91.4	32.9	23.0	6.5	27.4	17.4	121.5	6.6	10.3	13.7	0.0	21.3	0.0	8.1	0.0	3.6	0.6	13.3	0.0	7.3	482.1
Broad floodplains/ bottomlands	115.8	5.7	9.0	22.8	23.4	6.8	59.2	6.0	20.3	3.7	0.0	21.8	0.0	29.8	0.0	4.5	1.7	7.7	0.0	6.8	404.4
Other mesic	806.3	137.2	79.5	81.9	110.1	146.3	113.5	39.5	37.6	72.8	59.7	76.5	23.1	101.3	42.1	9.1	12.6	12.4	7.9	10.8	2,066.3
Swamps/bogs	94.0	14.3	2.5	926.6	439.3	70.6	348.3	0.0	596.4	12.8	0.0	94.8	2.3	44.5	1.3	0.0	1.9	71.1	0.0	15.6	2,793.3
Small drains	19.4	7.6	0.9	0.0	24.5	8.1	38.9	0.0	6.0	0.0	0.0	10.2	0.0	11.5	0.0	0.0	3.6	7.2	0.0	0.6	172.5
Bays and wet pocosins	165.1	53.0	8.0	757.0	1,080.1	95.0	426.7	8.8	437.9	27.7	0.0	177.6	1.6	63.7	7.1	2.7	31.3	53.9	4.9	10.2	3,601.2
Beaver ponds	11.1	0.0	0.0	0.0	0.0	3.4	6.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24.0
Other hydric	53.5	3.0	0.0	133.4	68.4	14.1	90.7	0.0	44.4	0.5	0.0	33.1	0.0	27.2	4.9	1.3	0.0	14.0	5.5	5.2	566.1
Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.5	0.0	0.0	4.5
Total	8,497.2	5,369.2	2,500.4	2,128.6	2,105.5	1,523.5	1,498.9	1,368.0	1,212.1	1,133.9	965.5	908.1	696.5	690.7	575.8	488.8	426.2	321.5	291.1	281.3	34,826.8

Table 6. Forest ownership categories in Bird Conservation Region 12 (acres; percent of column total in parentheses).

Ownership	Total BCR	MN	WI	MI
National Forest	5,227,704	1,767,181	1,253,558	2,206,936
	(15.0)	(14.9)	(14.8)	(15.2)
National Park Service	73,593	18,836	3,307	51,451
	(0.2)	(0.20)	(<0.1)	(0.4)
U.S. Fish and Wildlife Service	37,912	9,668	0	28,244
	(0.1)	(0.1)	(0.0)	(0.2)
Dept. of Defense	9,968	0	0	9,968
	(<0.1)	(0.0)	(0.0)	(0.1)
Other Federal	107,868	89,433	7,114	11,320
	(0.3)	(0.8)	(0.1)	(0.1)
State	8,035,204	3,742,817	632,086	3,660,262
	(23.1)	(31.5)	(7.5)	(25.3)
County/Municipal	3,655,862	1,771,383	1,734,671	149,774
	(10.5)	(14.9)	(20.5)	(1.0)
Other Local Government	28,967	7,135	6,883	14,949
	(0.1)	(0.1)	(0.1)	(0.1)
Private	17,649,900	4,476,437	4,834,088	8,339,282
	(50.7)	(37.7)	(57.1)	(57.6)
All	34,826,778	11,882,889	8,471,706	14,472,184
	(100.0)	(100.0)	(100.0)	(100.0)

Population Deficits and Habitat Goals

Table 7. Calculation of population deficits and habitat goals for American woodcock in BCR 12.

	Historical[1]		Current
Total land area (acres)			
Minnesota	22,839,411		22,839,411
Wisconsin	14,415,616		14,415,616
Michigan	41,027,334		41,027,334
U.S. sub-total	78,282,362		78,282,362
Manitoba	3,779,682		3,779,682
Ontario	47,247,620		47,247,620
Quebec	34,476,319		34,476,319
Canada sub-total	85,503,621		85,503,621
BCR total	163,785,983		163,785,983
Manageable acres			
Minnesota	8,581,900		11,882,889
Wisconsin	7,569,200		8,027,509
Michigan	14,928,400		14,472,184
Total	31,079,500		34,382,582
Manitoba			
Ontario	13,251,000		13,688,400
Quebec	29,513,700		29,548,300
Canada sub-total			
BCR total			
Population of singing males			
Minnesota	182,669		156,067
Wisconsin	108,141		79,712
Michigan	407,260		304,934
Total	698,070		540,714
Manitoba	63,064		21,609
Ontario	491,666		381,358
Quebec	58,347		58,276
Canada sub-total	613,077		461,243
BCR total			1,001,957
Population deficit (singing males)[2]			
Minnesota		7,344	
Wisconsin		32,067	
Michigan		35,077	
Total		74,488	
Manitoba			
Ontario		126,537	
Quebec		139	
Canada sub-total		126,676	
BCR total		201,164	
Habitat goal (acres)[3]			
Minnesota		73,440	
Wisconsin		320,670	
Michigan		350,770	
Total		744,880	
Manitoba			
Ontario		1,265,370	
Quebec		1,390	
Canada sub-total		1,266,760	
BCR total		2,011,640	

[1] Historical time period refers to ca. 1970-75.

[2] The population deficit is not simply the current population of singing males minus the historic level. The deficit considers the density of singing males on manageable acres for each time period.

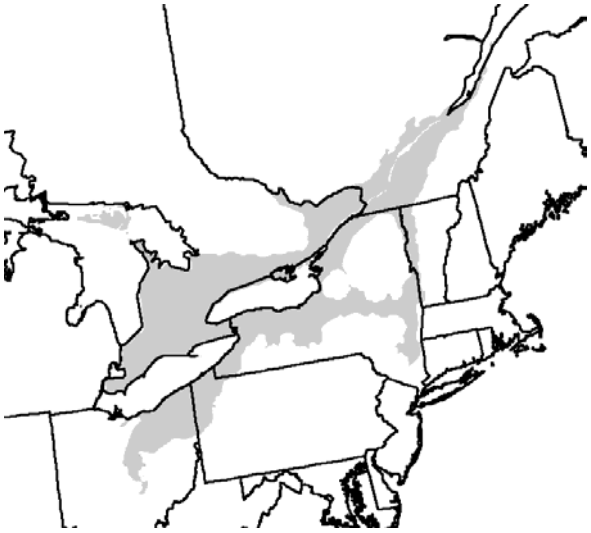
[3] The habitat goal is calculated as the population deficit multiplied by 10 acres.

Bird Conservation Region 13: Lower Great Lakes/St. Lawrence Plain

Affected states/provinces: Vermont, New York, Pennsylvania, Ohio, Ontario and Quebec

Current area of forest land: 23,592,700 acres (3,960,600 acres of small diameter and non-stocked forest)

Woodcock trend estimate (% change/year)	1968-2004: - 1.9 1995-2004: 0.0	Woodcock population estimate (singing males only)	1970: 382,540 2004: 283,582



Physiography and Habitat Description

BCR 13 is composed of the Lake Ontario Plain, eastern Lake Erie Plain, the St. Lawrence Plain, the Mohawk Valley and Upper Hudson River Valley, and the Champlain Valley (Figure 1). The BCR encompasses parts of New York, Pennsylvania, Vermont, Ohio, Ontario and Quebec. Figure 2 shows the relevant counties for states that are included in the data analysis for BCR 13. Much of the area is relatively flat, low-elevation river and lake plains. The

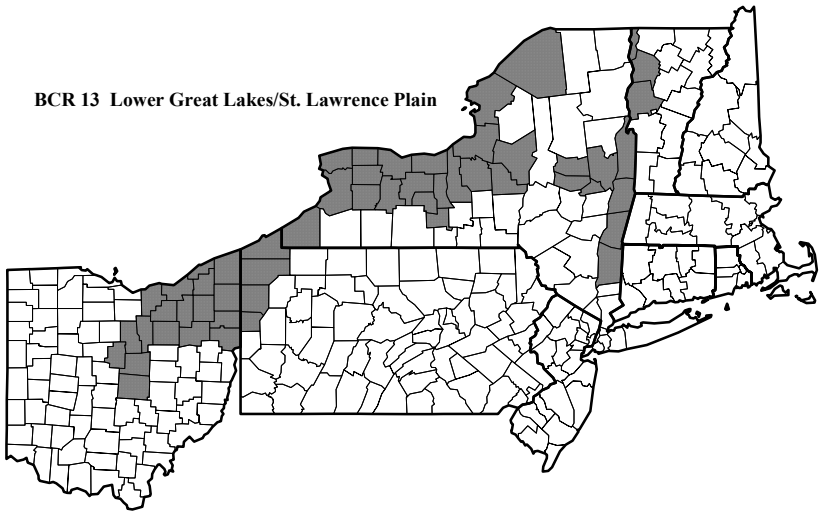


Figure 2. U.S. counties included in BCR 13.

topography and climate (relatively high rainfall and snowfall due to lake effect events) of much of the area also lead to considerable amounts of sheet water wetlands. The area historically has been dominated by agriculture, and much the same is true today in parts of the area. In other parts of the area, farmland abandonment has occurred (and is continuing) which leads to reversion of grasslands to shrublands and young forests. Some of the sheet water wetlands revert to swamps and alder runs, which are prime breeding and migration habitats for American woodcock. In much of the Canadian portion, intensive agriculture still dominates the landscape. Portions of the US side are under intense development pressure, such as the Champlain Valley and Hudson Valley, northern Ohio, and the southern shore of Lake Ontario. The majority of the BCR is comprised of Ontario (42%) and New York (27%). Smaller portions include Quebec (14%), Ohio (11%), Pennsylvania (4%) and Vermont (2%).

St. Lawrence Plain (paraphrased from PIF PA 18 Plan)

The St. Lawrence Plain encompasses the floodplain of the St. Lawrence River and parts of the eastern Great Lakes. Portions of the area are in southern Canada, including a small part of southernmost Quebec and a larger portion of southern Ontario, south and east of the Canadian Shield. The U.S. portions include the St. Lawrence Valley of northern New York, the Lake Champlain Valley of northwestern Vermont and adjacent parts of New York, and the Mohawk and upper Hudson River corridor.

This physiographic area is a vast, flat plain, which during the last glacial epoch lay at the bottom of the Champlain Sea. As this sea receded roughly 12,000 years ago, thick deposits of clay, and in some places sand, remained to form the modern soils of the region. This area therefore represents the best farmland in eastern Canada and northeastern U.S. Elevations rarely exceed 150m in Quebec, 200m in Ontario, and 300m in Vermont and New York, except for a few highland portions that reach 500m.

Historically, the St. Lawrence Plain was dominated by either sugar maple-beech-birch forest, mesic oak hardwood forest, red maple-black ash swamp forest, or silver maple floodplain forest. The maple-beech-birch (northern hardwood) forests of this region were diverse (= 10 tree species per site) and represented the northern limit for a number of eastern deciduous forest species (Desponts 1996). Silver maple forests filled the floodplain of the St Lawrence and other rivers, and stands of swamp white oak that formed at the back edge of the floodplain were another distinctive feature of this region (Desponts 1996). Pre-European settlement was prevalent in the St. Lawrence region for 5,000 years, including hunting, fishing, and agriculture. When Jacques Cartier arrived in 1535, he noted numerous clearings along the river where corn, beans, and squash were planted. Native Americans practiced slash-and-burn agriculture, moving every 10-15 yr. There were many villages of 1,000-2,000 people. Thus pre-European inhabitants had already created habitats for woodcock.

The St. Lawrence Plain represents one of the earliest and most extensive areas of European settlement and development in North America; very little of the original vegetation of the region remains intact. Human pressure has been particularly intense in the Canadian portions of the region, which contain most of the arable land in Canada.

The first Europeans (French) were primarily fur-trappers; by 1900 beaver populations were practically extinct, undoubtedly affecting woodcock populations. The British Conquest in 1759 marked the beginning of largescale land clearing and settlement. Logging of the St. Lawrence Valley preceded other parts of eastern North America and most timber was removed before commercial timber harvesting practices became established in neighboring regions.

Agriculture has been the primary land use throughout the planning unit for over 200 years. In recent decades, agriculture has concentrated and intensified in Quebec and Ontario, with abandonment of other arable lands in those provinces, and with increasing urbanization and industrialization along the St. Lawrence River. Major Canadian urban centers of Quebec, Montreal, and Ottawa are located in this region, primarily occupying former tidal and riverine wetlands and river islands. More intensified agriculture has resulted in loss of hedgerows and margins, increased livestock production, and continued clearing of remaining riparian stands and woodlots.

In the U.S. portions, urbanization has been less intense overall, but intense in some locations. Local development around Burlington, VT and Plattsburgh, NY has affected lands that formerly provided habitat for woodcock. In northern New York, land-use trends include increasing agricultural abandonment, shift towards intensified dairy production and "hobby farming," and increasing acres planted to corn, grain, and other row crops (Jasikoff; Cornell data).

Forest habitats that remain tend to be in smaller blocks that are reduced in tree-species diversity due to repeated selected cutting of sugar maple associates such as hickory, basswood, and butternut. A few more extensively forested patches remain on poor soils along the edges of the Canadian Shield and Adirondack highlands. In many portions of the region, however, farmland abandonment is leading to increased reforestation. This phenomenon is creating habitat for early successional species. Because so little of the natural vegetation remains in this region, effects of natural disturbance processes are dwarfed by human-induced disturbance and change. The natural mosaic of alder bottoms, shrub wetlands, grasslands, freshwater marshes, bogs and fens, hardwood and conifer swamps, and upland hardwoods constitute prime habitat for American woodcock.

Currently, the less developed and less intensely managed agricultural landscapes of the St. Lawrence Plain supports large populations of early successional bird species, such as American woodcock. Unlike in many other agricultural regions, climate and poor drainage conditions favor establishment of freshwater wetlands. These climatic conditions and the large-scale reversion of agricultural lands make the area important to early successional species such as woodcock and Golden-winged Warbler. Seasonal wetlands and wetlands provide important habitat for these species. Woodcock utilize moist soils for foraging, and Golden-winged Warblers appear to show some tendency toward wetter habitats in this area.

The vast majority of lands in this planning unit are in private ownership. The dynamic between agricultural intensification, agricultural abandonment, and urban development constitutes the most important bird conservation issue in the region, and various programs which promote wildlife conservation on private lands constitute the primary opportunity to enhance regional bird populations. Allowing nature to take its course cannot restore the disturbance maintained ecosystems present prior to European settlement. These conditions are likely lost forever due to the permanent loss of land to human development, disruption of natural processes, and loss of keystone species (Askins 2000).

Quebec Portion (taken from Quebec BCR 13 Report)

The area spans an international boundary and extends from the western end of Lake Erie almost to the head of the St. Lawrence estuary (up to the Cap Tourmente on the north shore and Rivière-du-Loup on the south shore). The BCR 13 is one of the most densely populated region in Canada since 90% of the Quebec population and a large part of the Ontario population inhabits the territory. In consequence, its remaining natural ecosystems are deeply fragmented by agriculture, by urban expansion, and by roads, rail lines, and other linking infrastructure. In the mean time, it also encompasses an array of biologically rich and diverse ecosystems containing a disturbingly large number of plant and animal species at risk or in decline. In Quebec, 24 species of aquatic birds, 19 species of shorebirds, 28 species of landbirds and 17 species of waterfowlhas been identified as possible priority species in this BCR. In such a setting, the aspirational quality of the NABCI really shines.

Ontario Portion (taken from Ontario BCR 13 Bird Conservation Report)

The Lower Great Lakes/St. Lawrence Plain Bird Conservation Region, BCR 13, encompasses 201,300 square kilometres of generally flat, lowlying land to the south of the Canadian Shield in Ontario and Quebec, and north of various highland systems in the four eastern U.S. states. In Ontario, BCR 13 encompasses 84,700 square kilometres, including all of southwestern Ontario, Manitoulin Island, a 50 to 100-km wide strip along the north shore of Lake Ontario and the upper St. Lawrence River, and the lower Ottawa Valley. The conservation needs and recommended actions for priority landbirds are not uniform across southern Ontario because people, land uses, habitats, and landbirds are unevenly distributed across the region. The variation in physical features across the region affect the current distribution and abundance of landbirds and their habitats. The overall topography of the Ontario portion of BCR 13 is quite subdued with elevations ranging from just under 50 m above sea level at the confluence of the Ottawa and St. Lawrence Rivers, to a high of 541 m in the Blue Mountains south of Collingwood. The local topography generally consists of flat to gently-sloping plains, with the notable exception of the Niagara Escarpment, a 30 to 50 m high bedrock scarp that snakes its way for some 500 km across the landscape of southwestern Ontario.

The temperate climate of this region is influenced by the Great Lakes. Summers are relatively warm and winters cool. Annual precipitation of 720 to 1000 mm is spread throughout the year. Snowfall is particularly heavy in “snowbelt” areas located downwind of the Great Lakes. Despite the loss of much of the original forsted and wetland habitats, some landbird habitats are more extensive now than in 1800. For example, shrub/successional habitats have likely increased overall, due to natural succession of abandoned farmlands and frequent logging in working forests (Larson et al. 1999). Open alvar grasslands and shrublands have increased in areas (e.g. Manitoulin Island, Bruce Peninsula) affected by a

series of large, intense forest fires in the early 1900s, that were fueled by waste wood left by previous logging activities (Brownell and Riley 2000).

United States Portion of Lake Ontario and Lake Erie Plain (paraphrased from PIF PA 15 Plan)

The Lower Great Lakes Plain covers the low lying areas to the south of Lake Ontario in New York, northeastern Ohio, and a small part of Northwestern Pennsylvania. It also includes a large portion of Ontario, north of Lakes Erie and Lake Ontario. This region was originally covered with a mixture of oak-hickory, northern hardwood, and mixed coniferous forests. The Carolinian Forest element in Ontario harbors unique and rare ecological communities. Roughly 74% of the land area is in agricultural production. Several large urban cities (Rochester, Syracuse, Buffalo, Windsor) are found in this area, which comprise 7.1% of the land area. Several important National Wildlife refuges, National Parks and State Wildlife Management Areas, including Montezuma, and Pt. Pelee National Park are found here.

The vast majority of the Lower Great Lakes Plain is in agricultural production. Forests that remain are in relatively small blocks. Agricultural abandonment is occurring which will temporarily favor early successional species, but increasingly land is being lost to development. Conversion of grasslands to crop lands may also be detrimental to woodcock.

The New York portion of the Lower Great Lakes Plain was not extensively settled by Europeans until after the American Revolution. Initial colonization was during the 1790s. A similar time frame for settlement probably applies for southern Ontario. The region was found to have large areas of productive farmland, and clearing of the pre-settlement forests generally took place during the first half of the 19th century. Forests were cleared both for agricultural purposes and for fuel wood. By the end of the 19th century, less than 20% of the original forest remained in many of the landscapes within this region (Zipperer et al. 1990). In many portions of southern Ontario and northwestern New York, forest cover remains very low (< 25%) today with agriculture and/or urban areas dominating these landscapes. However, forest cover has increased since the beginning of the 20th century in some areas, including the area north of the Carolinian Forest and south of the Canadian Shield in Ontario and the northeastern portion of this planning unit toward central New York. In 1990, forest cover in Onondaga County, New York, was estimated at about 35%. The city of Syracuse lies within this county, and it was also estimated that the existing forest cover was fragmented into more than 3,000 forest islands within the county (Zipperer et al. 1990).

Wetland habitats experiences similar amounts of loss during the period of settlement and high agricultural land use. Thibault and Zipperer (1994) estimated that by 1926, the landscape around Syracuse was 80% agricultural, with the remaining 20% either in forest or wetland cover. Also similar to forest cover, wetland cover has increased during the past century in some portions of the planning area where agricultural land use has diminished. Thibault and Zipperer (1994) found that 50% of the wetlands that existed in 1964 were new compared to 1926, and another 32% of wetlands were new in 1988. These increasing amounts of forest and wetland cover in some portions of the Lower Great Lakes Plain are a result of the poorer agricultural value of the land and the resulting farm abandonment. A general shift away from intensive farming to more hobby farming and more urban/suburban land uses also contributes to these trends.

Mohawk/ Upper Hudson Valley

These areas are primarily a diverse river floodplain. Historically the Hudson River has been a major breeding, and more critically, a migration corridor for woodcock. The upper Hudson River corridor and the Mohawk River corridor have been under intense development pressure that lead to a critical loss of riparian forests habitats. The pressure remains a threat to breeding and critical migration habitats. Reversion of formerly open and shrubland habitats to mature forests is also adding to the loss of critical habitats.

Threats

In portions of the BCR, urban sprawl and other development represents the largest threat to woodcock habitats. Urbanization affects these habitats in two related ways: direct loss through development, and rising economic pressures in surrounding areas that force private farmers to sell land to developers. These pressures are particularly acute in Canada, near the major metropolitan areas of Montreal, Toronto, Kingston, and Ottawa; in Vermont portions of the Champlain Valley near Burlington; and in New York, near Rochester, Syracuse, and Buffalo. Protection of riverine wetlands from industrial development is also a high priority along the St. Lawrence River, and throughout the BCR. These habitats provide critical breeding and migration habitats for woodcock.

Intensive agricultural expansion also has caused, and continues to cause, a decline in breeding and migration habitats in portions of the BCR. Historic agricultural practices provided ample habitat for woodcock. The small farms predominant then created a mosaic of habitat types that favored woodcock. Modern, intensive agricultural practices often leave little residual habitat available for woodcock. The filling of wetlands, removal of forest patches, and movement towards bigger consolidated fields with little shrub or forest remaining has resulted in greatly reduced habitat for woodcock. This trend continues throughout portions of the BCR, especially in southern Canada.

Between the current and baseline forest inventories there has been a gain of over 1 million acres (+ 13%) of timberland in this BCR (Tables 1a and 1b). However, there has been a net loss of over 2.3 million acres (-56%) of small diameter and non-stocked forest during the same period. New York, Ohio, and Vermont all showed very significant losses of useable habitat and a very high percent loss during the time period (Tables 2 and 3). Pennsylvania, Quebec and Ontario all showed small losses of habitat. Quebec and Ontario actually showed increases in habitat in the early successional stage, but decreases in the amount of habitat in the appropriate forest types which equated to an overall loss of suitable habitat. Major forest types include maple/beech/birch, oak/hickory, elm/ash/red maple, white/red/jack pine, aspen/birch, and spruce/fir (Table2 and 3). Approximately 91% of the timberland in the U.S. portion of the region is under private ownership (Table 4).

Woodcock Harvest and Population Status

The 2003 Woodcock Status Report (Kelley 2003) provides estimates for hunter numbers, and harvest of woodcock in states included in BCR 13 (Table 7). It should be noted that since the majority of each state does not fall within BCR 13, and there is no data from the Canadian portions of the BCR, these data should be used only for comparative purposes. There has been a rather disturbing declining trend in both numbers of hunters and in the estimated harvest over 33 years (Table 8). Since the specific numbers are subject to yearly variation, the most compelling information is in the general trends shown. Such dramatic declines, particularly in NY, show what appears to be a precipitous decline in hunting effort and harvest in only 33 years.

The American Woodcock Status Report (Kelley 2006) provides the most up to date estimates of population trends for states and provinces in the BCR. The long-term trend (1968-2006) for the Eastern Region is -1.9 % per year, whereas the period 1996-2006 showed no trend in the population (Table 9). This is encouraging news, but with early successional habitat trends still declining, it is uncertain how long this population stability will be maintained. It is important to remember that Table 9 provides population trends for the entire state or province, not the portion of the state/province in BCR 13. BCR 13 encompasses a fairly substantial part of New York State, but only relatively small parts of Vermont and Pennsylvania. Ohio, Ontario and Quebec fall in between, with a considerable portion included but most of the state or province not included. Since the majority of each state does not fall within BCR 13, Table 9 provides only a rough estimate of the actual population trend for this BCR. It is clear that woodcock populations in New York and Ohio continue to exhibit serious declines. Populations in Vermont and Pennsylvania appear to be stabilizing, while populations in Ontario and Quebec are on the rise. New York and Ohio need to take action to halt the declining trends.

Population and Habitat Goals

There has been a decline of nearly 99,000 singing male woodcock in the BCR since the early 1970s (Tables 10 and 11). To restore woodcock densities in BCR 13 to those observed during the early 1970s, a total of nearly 3 million acres of new woodcock habitat needs to be created (Table xx). In BCR 13, the vast majority of timberland is under private ownership. Therefore, state and federal resource agencies will need to enlist the help of individual and commercial private forestland owners in order to achieve habitat management goals. This is a tremendous amount of acreage to manage and will require a monumental undertaking and cooperation from a diverse group of parties, as well as considerable monetary investment.

Potential for Habitat Management

Identification of Areas/Habitats where Potential Exists for Active Management

A.1 Federal Lands

Fort Drum -120,000 Acres; DOD. One of the most significant shrubland breeding bird communities in NY State. Breeding species include Golden-winged Warbler, American Woodcock, and Common Nighthawk.

Iroquois National Wildlife refuge (NY).

Montezuma National Wildlife Refuge (NY).

Point Pelee, Canada.
Finger Lakes National Forest (NY).

Missisquoi Bay National Wildlife Refuge (VT)

Erie National Wildlife Refuge (PA)

A.2 New York

Portions of NYS that are within BCR 13 are also within the Adirondack Park Forest Preserve. The Adirondack Park has NYS constitutional provisions that prohibit logging or burning on state lands. This effectively eliminates the ability to manage these state owned lands for woodcock. The areas affected include: St. Lawrence, Washington, Essex, Saratoga, Clinton, and Fulton.

There are substantial areas of state owned lands NY that are not within Forest Preserve that could be managed to benefit woodcock. Although regulated, there are also private lands within the Forest Preserve that could be managed, where logging is allowed.

State Wildlife Management Areas

Upper and Lower Lakes State WMA, Eastern Lake Ontario Marshes, Lake Champlain Marshes (Kings Bay, Ausable Marshes, Monty's Bay, Wickham Marsh, Putts Creek),
Lewis Preserve WMA, Lake Alice WMA, Wilson Hill WMA, Point Peninsula WMA, Ashland Flats WMA, Fish Creek WMA, Northern Montezuma WMA, Lake Shore Marshes WMA, Oak Orchard/Tonawanda WMA, Carlton Hill WMA, French creek WMA, Indian River WMA, Perch River WMA, Littlejohn WMA, Happy Valley WMA, Three Mile Bay WMA, Cicero Swamp WMA, Three Rivers WMA, Braddock Bay WMA, Carlton Hill WMA, High Tor WMA, Carters Pond WMA, Capital District WMA, Partridge Run WMA, Knox WMA.

NYSDEC also owns considerable acreage in State Forests throughout BCR 13. The portions outside of the Adirondack Preserve are open to management.

The NY State Power Authority, and the NYS Office of Parks, Recreation and Historic Preservation also have considerable land holdings (particularly in the Upper St. Lawrence River/ Thousand Islands), although they tend to be less amenable to habitat management.

Vermont (WMAs)
Bird Mountain, Black Creek, Blueberry Hill, Brandon Swamp, Buczek Marsh, Cornwall Swamp, Dead Creek, East Creek, Elm Brook, Fairfield Swamp, Fred Johnson, Gale Meadows, Halfmoon Cove, Hubbardton Battlefield, Intervale, Lemon Fair, Lewis Creek, Little Otter Creek, Loves Marsh, Little Otter Creek, Maquam, Marsh Pond, Mud Creek, Pond Woods, Rock River, Sandbar, Snake Mountain, The Narrows, Ward Marsh.

Pennsylvania (State Game Lands)

314, 101, 191, 109, 152, 154, 29, 202, 277, 214, 213, 270.

Ohio State Lands

Auburn Marsh Wildlife Area, Beach City Wildlife Area, Berlin Lake Wildlife Area, Brush Creek Wildlife Area, Camp Belden Wildlife Area, Dorset Wildlife Area , Funk Bottoms Wildlife Area, Grand River Wildlife Area , Hambden Orchard , Highlandtown Wildlife Area, Jockey Hollow Wildlife Area, Keen Wildlife Area, Killbuck Marsh Wildlife Area, Leesville Lake Wildlife Area , Lower Killbuck Creek Wildlife Area , Mohican Wildlife Area, Mohler Wildlife

Area , Mosquito Creek Wildlife Area , New Lyme Wildlife Area, Orwell Wildlife Area, Shenango Wildlife Area, Shreve Lake Wildlife Area, Spencer Lake Wildlife Area, Valley Run Wildlife Area, Wellington Wildlife Area, West Branch State Park Wildlife Area.

Private Lands

Private lands and paper company lands represent the vast majority of the land in this BCR, and therefore, the greatest opportunity for management.

IV C. Other partnerships

Because of the large portions of the planning unit within Canada, coordinated efforts are vital for the success of any conservation plan. North American Bird Conservation Initiative planning is underway. It is a large-scale international effort for bird conservation. Current funding is largely through grants for wetlands protection, which should provide great utility for woodcock conservation, since early successional habitats near wetlands, will be incorporated into the plans.

Outreach will play a critical role in the northeast, as woodcock and the entire early successional bird suite is more threatened, due to more widespread and greater declines in populations, than any other species suite (grassland suite is in similar predicament). This is contrary to the misconception that forest interior species are in most decline and most threatened. Managers, environmentalists, and the public need to be educated that shrublands and early successional habitats are important to birds and need to be protected or managed for, and that these habitats provide critical diversity to the area. A program to develop demonstration sites throughout the various states and provinces would be beneficial in helping to educate the public, and provide habitat guidance to those interested in managing for woodcock and other early successional birds.

Table 1a. Current and historical (ca. 1970-75) stand-size distribution of timberland in Bird Conservation Region (BCR) 13 and portions of individual states within the BCR.

	Current stand-size distribution (acres)						Historical stand-size distribution (acres)				
Area	Total timberland	Large diameter[1]	Medium diameter[2]	Small diameter[3]	Non-stocked[4]		Total timberland	Large diameter	Medium diameter	Small diameter	Non-stocked
Vermont	461,000	312,400	103,200	45,400	0		481,500	221,700	109,400	143,500	6,900
New York	6,611,200	3,348,100	1,942,600	1,301,100	19,400		5,674,700	1,529,800	928,100	2,607,500	609,300
Pennsylvania	761,200	428,200	199,100	128,500	5,500		919,200	359,700	195,400	364,100	--[5]
Ohio	1,570,700	778,200	433,700	358,900	0		1,268,700	496,100	315,300	457,300	--[5]
Total	9,404,100	4,866,900	2,678,600	1,833,900	24,900		8,344,100	2,607,300	1,548,200	3,572,400	616,200

[1] Softwoods at least 9 inches, and hardwoods at least 11 inches in diameter at breast height; size class has more than 50% of stocking in medium and large diameter trees, with stocking of large trees equal to or greater than medium diameter trees.
[2] Trees at least 5 inches in diameter at breast height, but smaller than large diameter; size class has more than 50% of stocking in medium and large diameter trees, with stocking of large diameter trees less than stocking of medium diameter trees .
[3] Saplings 1-5 inches diameter at breast height, plus softwood seedlings more than 6 inches tall and hardwood seedlings more than 12 inches tall; size class has at least 50% of the stocking in small diameter trees.
[4] Commercial forest land on which stocking of trees is less than 16.7 percent.
[5] Included with small diameter.

Table 1b. Current and historical (1980) stand-size distribution of timberland in the Canadian portion of Bird Conservation Region (BCR) 13 and portions of individual provinces within the BCR.

	Current stand-size distribution (acres)				Historical stand-size distribution (acres)		
Area	Total timberland	Large diameter[1]	Small diameter[2]		Total timberland[1]	Large diameter[2,3]	Small diameter[2,5]
Ontario	12,568,800	10,686,100	1,882,700		12,274,100	10,478,400	1,795,700
Quebec	1,619,800	1,400,700	219,100		1,403,700	1,185,400	218,300
Total	14,188,600	12,086,800	2,101,800		13,677,800	11,663,800	2,014,000

[1] Trees greater than 5 inches in diameter at breast height.
[2] Trees less than or equal to 5 inches in diameter at breast height.

Table 2. Past and present acreage of suitable habitat (small diameter and excluding non-habitat, e.g. conifers)

	PAST			PRESENT		
State/Province	Approp. stage	Approp. type (%)	Total usable	Approp. stage	Approp. type (%)	Total usable
VT (1973)	150,240.0	66%	99,158.4	399,200.0	11.4%	45,400.0
PA (1978)	382,928.0	98%	375,269.4	1,531,300.0	22.7%	348,100.0
OH (1968)	466,446.0	97%	452,452.6	736,300.0	18.2%	134,000.0
NY (1968)	3,686,300.0	82%	3,022,766.0	1,186,000.0	21.3%	1,186,000.0
ON	1,795,700.0	81%	1,454,517.0	1,882,700.0	76%	1,430,852.0
QC	218,300.0	81%	176,823.0	219,100.0	76%	166,516.0
TOTAL	6,699,914.0	83%	5,580,986.4	5,954,600.0	56%	3,310,868.0

Table 3. Past and current acreage of suitable woodcock habitat for U.S. and Canada and percent change

Country	PAST	CURRENT	
	small dia.	small dia.	% change
U.S. subtotal (1970's to 2003)	3,949,649	1,713,500	-57%
Canada subtotal (1980 to 2005)	1,597,368	1,631,340	2%
TOTAL	5,547,017	3,344,840	-40%

Table 4. Acres (thousands) of forest by most common forest types for states in BCR 13.

Forest Type	VT	NY	PA	OH	Total
Maple/beech/birch	336.6	3,514.1	487.4	665.9	5,004.0
White/ red/ jack pine	60.3	784.5	24.9	29.9	899.5
Oak/hickory	10.6	849.8	142.5	618.6	1,621.5
Elm/ash/red maple	19.7	695.9	57.8	220.8	994.2
Spruce/fir	0	135.7	0	6.1	141.7
Oak/pine	0	130.2	0	0	130.2
Exotic softwoods	1.5	113.2	0	3.4	118.1
Aspen/birch	32.3	348.2	43.2	23.9	447.6
Pinyon/juniper	0	14.9	0	0	14.9
Loblolly/shortleaf pine	0	5.5	0.	0	5.5
Oak/gum/cypress	0	0	0	2.1	2.1
Non stocked	0	19.4	5.5	0	24.9

Table 5. Acres of forest by forest type group and stand size class in 2005 in the Lower Great Lakes/St. Lawrence Plain (BCR 13).

Forest Type Group	Total	Large Diameter[1]	Small Diameter[2]	% Small Diameter
Spruce-Fir	2,636,200	2,072,300	563,900	21.4%
Pine	1,829,500	1,569,300	260,200	14.2%
Oak-Pine	22,600	20,100	2,500	11.1%
Oak	1,574,400	1,369,500	204,900	13.0%
Elm-Ash	169,300	126,800	42,500	25.1%
Maple-Beech-Birch	10,566,000	9,429,700	1,136,300	10.8%
Aspen-Birch	2,764,900	2,379,400	385,500	13.9%
Uncl. Coniferous	286,000	235,600	50,400	17.6%
Uncl. Deciduous	2,528,100	1,847,300	680,800	26.9%
Uncl. Mixed Forest	936,300	823,200	113,100	12.1%
Total	23,313,300	19,873,200	3,440,100	14.8%

[1]Stands of trees > 5 inches (12.5 cm) d.b.h.

[2]Stands of trees ≤ 5 inches (12.5 cm) d.b.h. and nonstocked stands.

Table 6. Forest ownership categories in portions of states within Bird Conservation Region 13 (acres).					
Ownership	Total BCR (U.S.)	VT	NY	PA	OH
National Forest	50,800	45,400	5,400	0	0
Other Federal	68,100	6,300	57,600	0	4,200
State/County/Municipal	683,600	58,000	506,000	47,300	72,200
Private	8,601,700	351,300	6,042,100	713,900	1,494,300
All	9,404,200	461,000	6,611,200	761,200	1,570,700

Table 7. Active woodcock hunters, days afield, and woodcock harvest in states included in BCR 13.

State	active woodcock hunters		days afield		harvest	
	2001-2002	2002-2003	2001-2002	2002-2003	2001-2002	2002-2003
New York	5,300 +/- 37%	5,600 +/- 36%	25,700 +/- 147%	31,100 +/- 47%	8,800 +/- 55%	17,100 +/- 62%
Penn.	13,400 +/- 45%	9,600 +/- 44%	53,100 +/- 52%	40,900 +/- 57%	20,100 +/- 52%	10,100 +/- 40%
Vermont	900 +/- 39%	1,200 +/- 45%	4,700 +/- 36%	6,900 +/- 55%	3,100 +/- 28%	2,000 +/- 31%
Ohio	3,100 +/- 135%	5,200 +/- 108%	9,200 +/- 93%	23,400 +/- 137%	6,600 +/- 87%	3,400 +/- 43%

Table 8. Number of woodcock killed by duck stamp buyers and the number of hunters per state.

	Estimated Number of Woodcock Killed by Duck Stamp Buyers		Number of Hunters	
State	1968	2001	1968	2001
New York	76,528	5,593	21,977	3,493
Penn.	30,917	11,866	12,069	5,277
Vermont	4,553	3,446	1,578	920
Ohio	15,345	6,280	3,561	3,221

Table 9. Woodcock population trend estimates for states and provinces included in BCR 13.

State	% change 1968-2006	Significance	% change 1996-2006
New York	-2.5	p< 0.01	-2.5
Vermont	-0.7	na	0.9
Ohio	- 6.2	p< 0.01	-6.7
Pennsylvania	- 3.4	p< 0.01	-0.2
Quebec	-1.3	p< 0.01	7.6
Ontario	-1.9	p<0.01	3.1

Table 10. Singing males per acre of land.

State/Province in BCR 13		Historic		Current	
	Total Lands	N Singing Males	Singing Males per acre of land	N Singing Males	Singing Males per acre of land
New York	16,659,488	97,888	0.0059	62,239	0.0037
Ohio	7,396,762	25,413	0.0034	13,276	0.0018
Pennsylvania	2,330,541	12,831	0.0055	7,882	0.0034
Vermont	1,038,541	6,344	0.0061	4,363	0.0042
US subtotal	27,425,332	142,476	0.0052	87,760	0.0032
Ontario	20,750,294	193,746	0.0093	149,638	0.0072
Quebec	6,848,903	46,318	0.0068	46,184	0.0067
Canada subtotal	27,599,197	240,064	0.0087	195,822	0.0071
BCR 13 Total	55,024,529	382,540	0.0070	283,582	0.0052

Table 11. Densities of woodcock/ acre land and population deficit.
Population Goals

	Early Density	Late Density	Density Deficit	Population Deficit
NY	0.01556	0.00974	0.00582	37,184
OH	0.01618	0.00890	0.00728	10,855
PA	0.01698	0.01006	0.00692	5,423
VT	0.01229	0.00946	0.00283	1,305
US Subtotal				54,767
Ontario	0.01578	0.01190	0.00388	48,767
Quebec	0.03300	0.02851	0.00449	7,273
Can. Subtotal	0.04878	0.04041	0.00837	56,040
Total				110,807

Table 12. Habitat acres needed to restore woodcock populations to 1970's level. Based on actual acres/woodcock data for Canada.

Habitat Goals

	Acres/woodcock	Pop deficit	Habitat goals (acres)
NY	30.88	37,184	1,148,242
OH	17.80	10,855	193,219
PA	29.25	5,423	158,623
VT	15.64	1,305	20,410
US subtotal		54,767	1,520,494
Ontario	7.40*	48,767	360,876
Quebec	3.60*	7,273	26,183
Can. subtotal		56,040	387,059
Total		110,807	1,907,552

* These figures represent unrealistic figures for acres/woodcock.

Table 13. Habitat acres needed to restore woodcock populations to 1970's level. Based on using average of United States data for Canada.**

Habitat Goals

	Acres/woodcock	Pop deficit	Habitat goals (acres)
NY	30.88	37,184	1,148,242
OH	17.80	10,855	193,219
PA	29.25	5,423	158,623
VT	15.64	1,305	20,410
US subtotal		54,767	1,520,494
Ontario	27.7	48,767	1,350,846
Quebec	27.7	7,273	201,462
Can. subtotal		56,040	1,552,308
Total		110,807	3,072,802

** This table recalculates the habitat goals (acres) for Canada by using the average of the United States data (total acreage US divided by US population deficit, or 27.7 acres/woodcock). The calculations using the Canadian data for woodcock per acre resulted in unrealistic figures. The results were recalculated by utilizing more realistic U.S. figures for acres/woodcock.

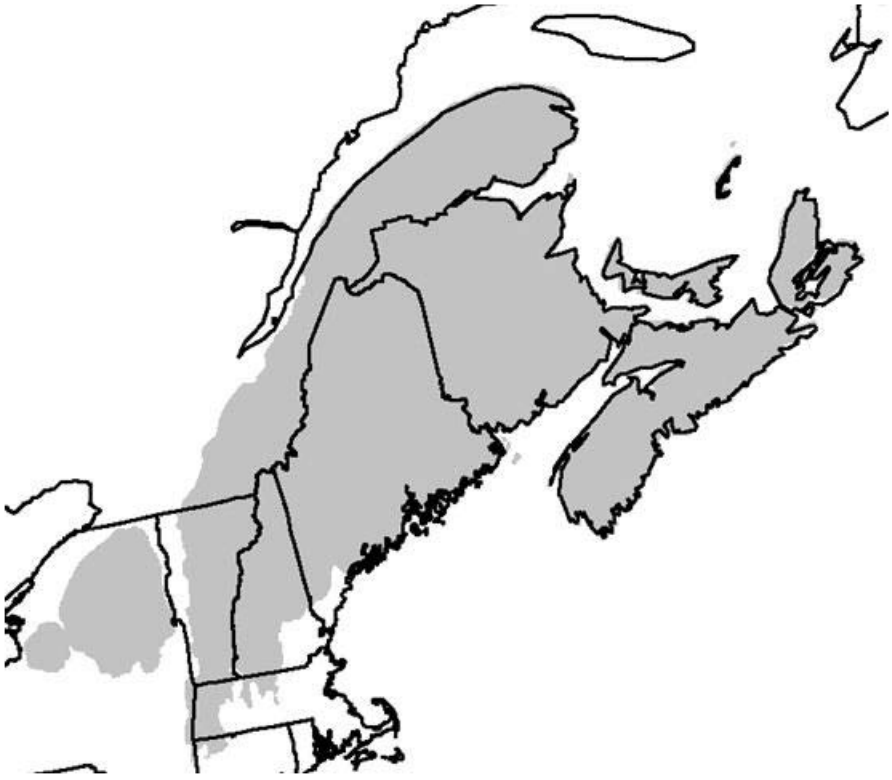
Bird Conservation Region 14: Atlantic Northern Forest

Affected states: Maine, New Hampshire, Vermont, Massachusetts, Connecticut, and New York

Current area of forest land: 63,484,982 acres (11,549,711 acres of small diameter and non-stocked forest)

Woodcock trend estimate (% change/year)	1966-2004: -0.43 1994-2004: 0.34		Woodcock density estimate (singing males/mi^2)	1970: 3.97 2004: 2.65

BCR 14: Atlantic Northern Region



The Atlantic Northern Forest (BCR 14) is 70% forested and comprised of 63.4 million acres (25.7 million ha) of forest, similar to the total forest area in 1968-73 (Table 1). Approximately 79% of the forest is privately owned; 21% is in public ownership (crown, federal, state, county) (Tables 2 and 3).

Bird Conservation Region 14 is a transitional forest landscape between deciduous-dominated forests to the south and coniferous-dominated forests to the north. Predominant forest types include spruce-fir and maple-beech-birch.

Maple-beech-birch forests have increased consistent with the loss of spruce-fir forest area since 1970 in BCR 14 states (Tables 6 and 7). Spruce-fir forest acreage has increased in the Canadian provinces as pine forests and mixed hardwood-softwood acreage has decreased (Tables 4 and 5). Although aspen-birch forests comprise only 7.5% of the current forest, aspen-birch forest has increased by 27.5% in the entire BCR since 1970 (Tables 4, 5, 6 and 7) and much of this increase has been in the small-diameter size class (Tables 8 and 9).

The increase in aspen and other deciduous forests, particularly in the small-diameter size class, is largely a result of extensive forest management on industrial forests in Maine and New Brunswick. Deciduous tree species are often a component of conifer-dominated forests in this region. After harvest, the deciduous regeneration can out-compete the coniferous regeneration, which can lead to forest type conversion. This conversion from coniferous to deciduous is sometimes interrupted by selecting against deciduous regeneration through the use of herbicides or mechanical treatment and planting of spruce plantations.

The estimated woodcock breeding population density for BCR 14 has decreased by 0.43% / year since 1970. The estimated number of singing males in BCR 14 decreased from 384,592 in 1970 to 292,119 in 2005. The greatest percent loss of males has occurred in CT (62%), MA (46%), and PEI (38%) (Table 10). This decrease is likely a result of the decrease of small-diameter size class forests in all the states in the BCR except Maine (Table 1). Based on the calculated deficit of singing males, and the estimated acreage of forest per male in each state or province, we need to manage about 4,760,000 acres of forest land to increase woodcock populations to historic levels (Table 10).

The relatively high proportion of the forest owned and managed by the forest products industry in Maine (43%), New Brunswick (19%) and Nova Scotia (18%) will aid in sustaining regional woodcock populations. The increase in aspen-birch forests in Maine will, likewise, aid in attaining this objective. However, ongoing declines in the area of small-diameter stands in other states and provinces will likely lead to continued declines of woodcock populations within these portions of this region.

The area of small-diameter forest required to maintain 1970 woodcock population densities are identified for each state / province (Table 10). We would recommend that all aspen-birch forests would be maintained on the landscape using a 60 year rotation. Using this rotation length, approximately 33% of the aspen-birch forest at any given point in time would be in the small-diameter size class. We recommend management of all aspen-birch, red maple, and all intolerant hardwood stands so that 15-20% would be maintained in small-diameter size classes. In this region, even-aged management of spruce-fir forest types usually results in mixed intolerant hardwood-spruce fir forests that are used extensively by woodcock. The challenge will be to attain habitat goals in the non-industrial forests of the BCR.

Table 1. Forest Composition within BCR 14: Acreage and size classes of trees within portions of states and provinces in BCR 14										
	Current stand-size distribution (acres)					Historical stand-size distribution (acres) (1968-73)				
Area	Total timberland	Large diameter[3]	Medium diameter[4]	Small diameter[5]	Non-stocked[6]	Total timberland	Large diameter	Medium diameter	Small diameter	Non-stocked
Connecticut	410,488 (0.65)[1,2]	310,530 (0.7)	80,690 (0.8)	14,316 (0.1)	4,951	399,100 (0.6)	188,000 (0.5)	125,300 (1.5)	85,800 (0.6)	0
Maine	16,701,511 (26.3)	5,492,210 (13.1)	6,188,814 (61.0)	4,973,720 (43.3)	46,767	16,395,400 (26.2)	5,982,100 (14.8)	5,254,700 (62.1)	5,015,500 (37.6)	143,100 (30.6)
Massachusetts	748,328 (1.2)	619,243 (1.5)	109,855 (1.1)	19,230 (0.2)	0	757,800 (1.2)	333,900 (0.8)	257,300 (3.0)	152,500 (1.1)	14,100 (3.0)
New Hampshire	4,188,680 (6.6)	2,357,323 (5.6)	1,410,003 (13.9)	408,156 (3.6)	13,198	4,194,700 (6.7)	1,715,100 (4.3)	1,420,300 (16.8)	1,027,500 (7.7)	31,800 (6.8)
New York	3,240,178 (5.1)	1,646,266 (3.9)	1,125,621 (11.1)	462,086 (4.0)	6,205	3,356,100 (5.4)	1,291,300 (3.2)	560,500 (6.6)	1,255,800 (9.2)	248,500 (53.1)
Vermont	4,143,397 (6.5)	2,524,822 (6.0)	1,231,493 (12.1)	387,082 (3.4)	0	3,948,400 (6.3)	1,839,400 (4.6)	845,100 (10.0)	1,233,000 (9.2)	30,900 (6.6)
US Total	29,432,582 (46.4)	12,950,394 (31.0)	10,146,477 (100.0)	6,264,590 (54.6)	71,121	29,051,500 (46.4)	11,349,800 (28.2)	8,463,200 (100.0)	8,770,100 (65.8)	468,400 (100.0)
New Brunswick	15,104,300 (23.8	12,294,100[7] (29.4)	**[7]	2,810,200[8] (24.5)	**[8]	14,684,600 (23.5)	12,523,600[7] (31.1)	**[7]	2,161,000[8] (16.2)	**[8]
Nova Scotia	9,571,500 (15.1)	8,755,200[7] (21.0)	**[7]	816,300[8] (7.1)	**[8]	9,696,700 (15.5)	8,842,600[7] (21.9)	**[7]	854,100[8] (6.4)	**[8]
Prince Edward Isle	601,200 (0.9)	478,700[7] (1.1)	**[7]	122,500[8] (1.1)	**[8]	666,100 (1.1)	542,000[7] (1.3)	**[7]	124,100[8] (0.9)	**[8]
Quebec	8,775,400 (13.8)	7,310,400[7] (17.5)	**[7]	1,465,000[8] (12.8)	**[8]	8,475,900 (13.5)	7,047,000[7] (17.5)	**[7]	1,428,900[8] (10.7)	**[8]
Canada Total	34,052,400 (53.6)	28,838,400[7] (69.0)		5,214,000[8] (45.4)	**[8]	33,523,300 (53.6)	28,955,200[7] (71.8)	**[7]	4,568,100[8] (34.2)	**[8]
Total BCR	63,484,982	41,788,794[7]	**[7]	11,478,590[8]	**[8]	62,574,800	40,305,000[7]	**[7]	13,338,200[8]	**[8]

[1] Percentages in parentheses. Percentages for total forestland refer to percent of column total.

[2] Percentages for various diameter categories and non-stocked category refer to percent of total forestland for current and historic time periods within each state.
[3] Softwoods at least 9 inches, and hardwoods at least 11 inches in diameter at breast height.
[4] Trees at least 5 inches in diameter at breast height, but smaller than large diameter.
[5] Saplings 1-5 inches diameter at breast height, plus softwood seedlings more than 6 inches tall and hardwood seedlings more than 12 inches tall.
[6] Commercial forest land on which stocking of trees is less than 16.7 percent.
[7] Included in large diameter totals
[8] Included in small diameter totals

Table 2. Current forest acreage of timberland by ownership by states in BCR 14.

Ownership class	Total (% of BCR)	Connecticut	Maine	Massachusetts	New Hampshire	New York	Vermont
National Forest	1,020,852 (3.5)	0	47,240	0	624,785	0	348,827
Fish and Wildlife Service	93,205 (0.3)	0	33,314	0	30,727	0	29,165
Dept of Defense	91,905 (0.3)	0	7,123	20,731	14,072	30,232	19,747
Other federal	32,766 (0.1)	0	7,910	0	0	0	24,857
State	1,447,172 (4.9)	39,611	477,147	240,441	238,284	222,778	228,912
County and Municipal	365,717 (1.3)	14,405	151,352	25,914	119,531	32,481	22,034
Other local government	5,872 (0.02)	0	5,872	0	0	0	0
Private	26,179,599 (89.5)	356,472	15,971,553	461,242	3,161,281	2,954,687	3,274,364
Total	29,237,090	410,488	16,701,511	748,328	4,188,680	3,240,178	3,947,905

Table 3. Current forest acreage of timberland by ownership by provinces in BCR 14.

Ownership class	Total (% of BCR)	New Brunswick	Nova Scotia	Prince Edward Island	Quebec
Non-industrial Private	9,800,960 (24.7)	4,613,960	4,512,690	674,310	
Industrial Private	12,211,257 (30.8)	3,035,630	2,181,010	0	6,994,617
Provincial / Crown	17,351,181 (43.8)	7,249,450	2,717,000	49,400	7,335,331
Federal / Native	5,187 (0.01)	0	2,717	2,470	
Federal / other	269,971 (0.7)	18,031	249,470	2,470	
Total	39,638,556	14,917,071	9,662,887	728,650	14,329,948

Table 4. Forest Composition within Canadian provinces in BCR 14: Acreage of forest types contained with states 1979-1985 inventories.						
Province (Inventory year)	NB [1979]	NS[1985]	PEI[1980]	PQ [1980]		TOTAL
Pine		901,000 (100%)				901,000 (100%)
Spruce – Fir	5,576,100 (60%)	3,440,900 (37%)	272,704 (3%)			9,289,704 (100%)
Conifer	5,576,100 (39.8%)	4,341,900 (31%)	272,704 (1.9%)	3,832,700 (27.3%)		14,023,404 (100%)
Oak-Pine						
Oak		89,600 (100%)				89,600 (100%)
Maple-Beech	1,317,700 (35.1%)	2,281,000 (60.6%)	162,154 (4.3%)			3,760,854 (100%)
Aspen-Birch	876,600 (56.8%)	536,500 (34.7%)	131,393 (8.5%)			1,544,493 (100%)
Deciduous	2,194,300 (31.5%)	2,817,500 (40.4%)	293,547 (4.2%)	1,665,100 (23.9%)		6,970,447 (100%)
Mixed	6,912,200 (56%)	2,447,700 (19.9%)		2,978,100 (24.1%)		12,338,000 (100%)
Total						48,917,502

Table 5. Forest Composition within Canadian provinces in BCR 14: Acreage of forest types contained with states 1997-2000 inventories.						
Province (Inventory year)	NB (1998)	NS (1998)	PEI (2000)	PQ (1997)		TOTAL
Pine		1,135,200 (100%)				1,135,200 (100%)
Spruce – Fir	6,222,700 (56.4%)	4,540,600 (41.2%)	264,600 (2.4%)			11,027,900 (100%)
Conifer	6,222,700 (38.9%)	5,675,800 (35.5%)	264,600 (1.6%)	3,834,100 (24%)		15,997,200 (100%)
Oak-Pine		15,400 (100%)				15,400 (100%0
Oak		39,400 (100%)				39,400 (100%)
Maple-Beech	3,548,600 (74.5%)	1,036,700 (21.8)	175,300 (3.7%)			4,760,600 (100%)
Aspen-Birch	1,605,000 (80.1%)	236,200 (11.8%)	161,300 (8.1%)			2,002,500 (100%)
Deciduous	5,153,600 (61.7%)	1,327,700 (15.9%)	336,600 (4.0)	1,530,000 (18.3%)		8,347,900 (99.9%)
Mixed	3,728,000 (38.4)	2,568,000 (26.5)		3,411,300 (35.1%)		9,707,300 (100%)
Total						

Table 6. Forest Composition within BCR 14: Acreage and percent occurrence of forest types contained among states within the BCR, 1968-1973 inventories.

STATE (Inventory year)	CT (1972)	MA (1972)	ME (1971)	NH (1973)	NY (1968)	VT (1973)	Total
Pine	82,000 1.7%	215,900 4.5%	1,965,200 40.6%	1,211,800 29.2%	421,900 8.7%	557,600 15.3%	4,443,400 100%
Spruce-Fir	0 0.0%	13,500 0.5%	7,929,000 29.7%	627,100 23.5%	392,500 17.7%	751,000 28.6%	9,713,100 100%
Oak/Hickory	124,400 17.7%	129,500 18.4%	0 0.0%	274,800 39.1%	132,500 14.7%	70,900 10.1%	732,100 100%
Elm-Ash-Cottonwood-Red Maple	109,700 3.1%	187,800 5.3%	1,626,300 45.7%	628,700 17.7%	532,500 14.9%	446,900 13.3%	3,531,900 100%
Maple-Beech-Birch	69,900 0.8%	192,900 2.3%	3,524,700 41.3%	1,240,000 14.5%	1,518,700 17.8%	1,836,200 23.2%	8,382,400 100%
Aspen-Birch	13,100 0.6%	18,200 0.8%	1,350,200 61.8%	212,300 9.7%	358,000 16.4%	218,000 10.7%	2,169,800 100%
Non-stocked	0 0.0%	14,100 3.1%	143,100 30.1%	31,800 6.8%	248,500 53.1%	30,900 6.7%	468,400 100%

Table 7. Forest Composition within BCR 14: Percentage occurrence of forest types contained among states within the BCR, 2003-2004 inventories.

STATE (Inventory year)	CT (2004)	MA (2004)	ME (2003)	NH (2003)	NY (2004)	VT (2004)	Total
Pine	39,146 1.7%	71,173 3.0%	926,769 39.2%	596,356 25.2%	407,892 17.2%	324,776 13.7%	2,366,112 100%
Spruce-Fir	0 0.0%	22,281 0.4%	4,690,370 85.9%	420,797 7.7%	130,384 2.4%	197,478 3.6%	5,461,310 100%
Other Softwood	39,611 1.8%	106,755 4.9%	1,296,526 60.3%	216,989 10.1%	194,221 9.0%	297,049 13.8%	2,151,151 100%
Oak/Hickory	189,634 19.5%	139,402 14.4%	227,627 23.5%	298,704 30.8%	66,044 6.8%	48,973 5.0%	970,385 100%
Elm-Ash-Cottonwood-Red Maple	29,709 1.2%	102,839 4.3%	1,007,107 42.0%	308,724 12.9%	570,403 23.8%	379,743 15.8%	2,3986,525 100%
Maple-Beech-Birch	107,437 0.8%	305,877 2.4%	6,242,279 49.4%	2,081,794 16.5%	1,684,222 13.3%	2,403,575 19.0%	12,647,233 100%
Aspen-Birch	0 0.0%	0 0.0%	2,262,279 75.6%	252,114 8.42%	180,807 6.0%	295,325 9.9%	2,990,524 100%
Non-stocked	4,9511 0.0%	0 0.0%	48,282 79.4%	13,198 15.3%	6,205 0.0%	987 5.3%	73,624 100%

Table 8. Current stand size class[1] composition (acres) of the most common forest types found in states within BCR 14.

	Forest Type														
Stand size class	Jack Pine	Red pine	Eastern white pine	White pine / hemlock	Eastern hemlock	Balsam fir	White spruce	Red spruce	Red spruce / balsam fir	Black spruce	Tamarack	Northern white-cedar	Pitch pine	Scotch pine	Other exotic softwoods
MAINE															
Large diameter	0	13,413	299,404	126,659	191,726	344,622	41,196	597,808	278,246	17,514	9,100	562,728	0	0	0
Medium diameter	5,803	7,392	121,187	28,194	53,858	491,645	56,321	330,587	190,947	214,110	34,427	345,797	0	0	6,155
Small diameter	0	17,779	13,116	4,596	6,717	1,150,948	83,136	178,737	511,530	203,022	15,320	59,268	0	0	11,428
NEW HAMPSHIRE															
Large diameter	0	4,660	254,146	63,374	213,250	26,886	0	33,713	57,612	0	0	0	0	0	0
Medium diameter	0	0	0	0	0	78,322	0	72,861	67,649	0	0	0	14,576	0	0
Small diameter	0	0	0	0	3,739	76,074	0	0	7,682	0	0	0	0	0	0
VERMONT															
Large diameter	0	9,872	97,302	77,720	242,888	48,665	0	18,378	35,958	0	0	23,200	0	0	0
Medium diameter	0	0	16,130	0	9,914	82,383	0	0	7,443	0	0	0	0	0	21,047
Small diameter	0	0	0	0	0	4,651	0	0	0	0	0	0	0	0	0
NEW YORK															
Large diameter	0	49,064	103,096	39,772	120,268	10,649	0	0	0	0	0	13,663	0	3,763	22,673
Medium diameter	0	0	21,366	0	0	18,894	0	26,522	0	0	0	12,572	0	15,053	0
Small diameter	0	0	0	0	0	29,131	0	0	15,468	14,921	0	0	0	0	0
MASSACHUSETTS															
Large diameter	0	0	10,367	20,731	86,024	0	0	22,281	0	0	0	0	0	0	0
Medium diameter	0	0	0	0	20,731	0	0	0	0	0	0	0	0	0	0
Small diameter	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CONNECTICUT															
Large diameter	0	0	0	0	39,611	0	0	0	0	0	0	0	0	0	0
Medium diameter	0	0	4,488	0	0	0	0	0	0	0	0	0	0	0	0
Small diameter	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total BCR															
Large diameter	0	77,009	764,315	328,256	893,767	430,822	41,196	672,180	371,816	17,514	9,100	599,591	0	3,763	22,673
Medium diameter	5,803	7,392	163,171	28,194	84,503	671,244	56,321	429,970	266,039	214,110	34,427	358,369	14,576	15,053	27,202
Small diameter	0	17,779	13,116	4,596	10,456	1,260,804	83,136	178,737	534,680	217,943	15,320	59,268	0	0	11,428
Forest Type Total	5,803	102,180	940,602	361,046	988,726	2,362,870	180,653	1,280,887	1,172,535	449,567	58,847	1,017,228	14,576	18,816	61,303

[1] **Large diameter** trees: hardwoods at least 11 inches diameter, 9 inches for softwoods: size class has more than 50% of stocking in medium and large diameter trees, with stocking of large trees equal to or greater than medium diameter trees.

[1] **Medium diameter** trees: trees at least 5 inches diameter but not as large as large diameter trees; size class has more than 50% stocking in medium and large diameter trees, with stocking of large diameter trees less than stocking of medium diameter trees.

[1] **Small diameter** trees: trees less than 5 inches diameter; size class has at least 50% of the stocking in small diameter trees.

Table 8. Current Stand size class[1] composition (acres) of the most common forest types found in states within BCR 14.

	Forest Type															
Stand size class	White pine / red oak / white ash	Eastern redcedar / hardwood	Other Pine / Hardwood	White oak / red oak / hickory	Northern red oak	Bur Oak	Chestnut oak / black oak / scarlet oak	Red maple / oak	Mixed upland hardwoods	Sweetbay / swamp tupelo / red maple	Black ash / American elm / red maple	River birch / sycamore	Cottonwood	Willow	Sycamore / pecan / American elm	Sugarberry / hackberry / elm / green ash
MAINE																
Large diameter	124,500	0	5,964	19,501	50,223	0	0	0	0	0	11,907	0	0	0	0	0
Medium diameter	115,748	0	8,507	45,083	76,799	0	0	13,401	1,251	17,266	64,452	0	1,317	0	4,303	9,923
Small diameter	32,986	0	1,520	7,648	9,349	0	0	5,623	16,799	0	41,400	16,892	6,081	17,152	4,997	2,024
NEW HAMPSHIRE																
Large diameter	194,939	0	0	99,194	84,619	0	0	0	0	0	0	0	0	0	0	0
Medium diameter	50,085	0	0	40,412	60,284	0	0	0	0	11,217	0	0	0	0	0	0
Small diameter	14,576	0	0	14,195	0	0	0	0	3,393	0	0	0	0	0	12,505	0
VERMONT																
Large diameter	108,563	0	0	16,130	14,809	0	18,034	0	0	4,937	0	0	0	0	0	0
Medium diameter	15,188	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22,034
Small diameter	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9,303	0
NEW YORK						6,565										
Large diameter	73,801	10,247	0	3,416	0	0	0	0	15,053	0	0	0	0	0	9,861	0
Medium diameter	44,387	0	0	13,816	27,326	0	0	14,921	15,116	0	14,921	0	0	0	0	11,290
Small diameter	14,921	0	0	0	0	0	0	0	15,116	0	0	0	0	0	15,116	0
MASSACHUSETTS																
Large diameter	37,829	0	0	22,281	91,207	0	20,731	0	0	0	0	0	0	0	0	0
Medium diameter	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small diameter	2,246	0	0	5,183	0	0	0	0	0	0	0	0	0	0	0	0
CONNECTICUT																
Large diameter	20,341	0	0	93,627	19,806	0	0	0	9,903	0	0	0	0	0	0	0
Medium diameter	0	0	0	56,396	19,806	0	0	0	0	0	0	0	0	0	0	0
Small diameter	14,316	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total BCR						6,565										
Large diameter	559,973	10,247	5,964	254,149	260,664	0	38,765	0	24,956	4,937	11,907	0	0	0	9,861	0
Medium diameter	225,408	0	8,507	155,707	184,215	0	0	28,322	16,367	28,483	79,373	0	1,317	0	4,303	43,247
Small diameter	79,045	0	1,520	27,026	9,349	0	0	5,623	35,308	0	41,400	16,892	6,081	17,152	41,921	2,024
Forest Type Total	864,426	10,247	15,991	436,882	454,228	6,565	38,765	33,945	76,631	33,420	132,680	16,892	7,398	17,152	56,085	45,271

[1] **Large diameter** trees: hardwoods at least 11 inches diameter, 9 inches for softwoods: size class has more than 50% of stocking in medium and large diameter trees, with stocking of large trees equal to or greater than medium diameter trees.

[1] **Medium diameter** trees: trees at least 5 inches diameter but not as large as large diameter trees; size class has more than 50% stocking in medium and large diameter trees, with stocking of large diameter trees less than stocking of medium diameter trees.

[1] **Small diameter** trees: trees less than 5 inches diameter; size class has at least 50% of the stocking in small diameter trees.

Table 8. Current Stand size class[1] composition (acres) of the most common forest types found in states within BCR 14.

	Forest Type													
Stand size class	Silver maple / American elm	Red maple / lowland	Sugar maple / beech / yellow birch	Black cherry	Cherry / ash / yellow-poplar	Hard maple / basswood	Elm / ash / locust	Red maple / upland	Aspen	Paper birch	Balsam poplar	Other	Non stocked	Total
MAINE													46,767	46,767
Large diameter	0	10,970	2,443,798	1,774	19,455	0	0	89,298	104,280	119,144	8,979	0		5,492,209
Medium diameter	4,633	71,641	2,590,030	0	70,685	0	0	270,428	370,328	530,123	34,958	1,515		6,188,814
Small diameter	11,654	35,287	1,193,222	4,017	58,997	15,499	3,121	139,387	456,679	587,809	49,979	0		4,973,719
NEW HAMPSHIRE													13,198	13,198
Large diameter	16,768	0	1,153,665	0	29,614	14,620	0	58,020	5,491	46,752	0	0	0	2,357,323
Medium diameter	0	18,220	786,632	0	21,178	0	0	103,986	0	84,581	0	0	0	1,410,003
Small diameter	0	0	126,877	15,363	0	0	0	18,461	32,098	69,615	13,578	0	0	408,156
VERMONT													0	0
Large diameter	0	0	1,427,045	0	0	48,341	4,033	113,702	34,447	47,566	0	987	0	2,392,577
Medium diameter	0	0	723,004	0	4,033	14,871	0	196,845	38,542	62,811	0	0	0	1,214,245
Small diameter	0	0	190,314	0	24,857	0	0	0	40,467	71,492	0	0	0	341,084
NEW YORK													6,205	12,770
Large diameter	0	0	755,764	0	13,663	65,142	3,416	141,086	35,415	0	0	0	0	1,489,812
Medium diameter	0	15,919	514,945	0	18,870	0	0	135,686	29,974	29,131	0	0	0	980,709
Small diameter	0	0	136,868	45,178	26,028	0	0	11,190	13,137	18,529	0	0	0	355,603
MASSACHUSETTS														
Large diameter	0	0	239,035	8,931	59,827	0	0	0	0	0	0	0	0	619,244
Medium diameter	0	0	66,843	0	0	0	0	22,281	0	0	0	0	0	109,855
Small diameter	0	0	0	0	11,800	0	0	0	0	0	0	0	0	19,229
CONNECTICUT													4,951	4,951
Large diameter	0	19,806	102,486	0	0	4,951	0	0	0	0	0	0	0	310,531
Medium diameter	0	0	0	0	0	0	0	0	0	0	0	0	0	80,690
Small diameter	0	0	0	0	0	0	0	0	0	0	0	0	0	14,316
Total BCR													71,121	77,686
Large diameter	16,768	30,776	6,121,793	10,705	122,559	133,054	7,449	402,106	179,633	213,462	8,979	987	0	12,661,696
Medium diameter	4,633	105,780	4,681,454	0	114,766	14,871	0	729,226	438,844	706,646	34,958	1,515		9,984,316
Small diameter	11,654	35,287	1,647,281	64,558	121,682	15,499	3,121	169,038	542,381	747,445	63,557	0	0	6,112,107
Forest Type Total	33,055	171,843	12,450,528	75,263	359,007	163,424	10,570	1,300,370	1,160,858	1,667,553	107,494	2,502	71,121	28,835,805

[1] **Large diameter** trees: hardwoods at least 11 inches diameter, 9 inches for softwoods: size class has more than 50% of stocking in medium and large diameter trees, with stocking of large trees equal to or greater than medium diameter trees.

[1] **Medium diameter** trees: trees at least 5 inches diameter but not as large as large diameter trees; size class has more than 50% stocking in medium and large diameter trees, with stocking of large diameter trees less than stocking of medium diameter trees.

[1] **Small diameter** trees: trees less than 5 inches diameter; size class has at least 50% of the stocking in small diameter trees.

Table 9. C urrent stand size class[1,2] composition (acres) of the most common forest types found in Canadian provinces within BCR 14.

Stand size class	Pine	Spruce-Fir	Conifer	Oak-Pine	Oak	Maple-Beech	Aspen-Birch	Deciduous	Mixed	Total
New Brunswick										
Large-medium diameter[1]		5,222,000				2,852,500	1,141,000		3,078,600	12,294,100
Small diameter[2]		1,000,700				696,100	464,000		649,400	2,810,200
Nov Scotia										
Large-medium diameter	1,008,500	4,033,900		14,500	38,300	1,007,300	229,500		2,423,200	8,755,200
Small diameter	126,700	506,700		900	1,100	29,400	6,700		144,800	816,300
Prince Edward I.										
Large-Medium diameter		221,700				153,500	103,500			478,700
Small diameter		42,900				21,800	57,800			122,500
Quebec										
Large-Medium diameter			3,331,800					1,284,600	2,694,000	7,310,400
Small diameter			502,300					245,400	717,300	1,465,000
Total										
Large-Medium diameter	1,008,500	9,477,600	3,331,800	14,500	38,300	4,013,300	1,474,000	1,284,600	8,195,800	28,838,400
Small diameter	126,700	1,550,300	502,300	900	1,100	747,300	528,500	245,400	1,511,500	5,214,000

[1] Large and Medium diameter size class includes all pole- and sawtimber-sized stands {trees ≥ 5 inches (12.5 cm) d.b.h.}.

[2] Small diameter size class includes all seedling/sapling stands {trees < 5 inches (12.5 cm) d.b.h.} and nonstocked stands.

Table 10. Calculation of population deficits and habitat goals for American woodcock in Bird Conservation Region 14.			
	Historical[1]		Current
Total land area (acres)			
Connecticut	604,525		604,525
Maine	21,832,518		21,832,518
Massachusetts	1,069,446		1,069,446
New Hampshire	5,230,125		5,230,125
New York	6,540,326		6,540,326
Vermont	5,114,656		5,114,656
New Brunswick	17,897,795		17,897,795
Nova Scotia	14,157,199		14,157,199
Prince Edward Island	1,489,246		1,489,246
Quebec	17,364,567		17,364,567
Total	91,300,404		91,300,404
Manageable acres			
Connecticut	399,100		410,488
Maine	16,395,400		16,701,511
Massachusetts	757,800		748,328
New Hampshire	4,194,700		4,188,680
New York	3,356,100		3,240,178
Vermont	3,948,400		4,143,397
New Brunswick	14,684,600		15,104,300
Nova Scotia	9,696,700		9,571,500
Prince Edward Island	666,100		601,200
Quebec	8,475,900		8,775,400
Total	62,574,800		63,484,982
Population of singing males			
Connecticut	2,349		896
Maine	168,170		108,952
Massachusetts	4,445		2,393
New Hampshire	29,505		21,970
New York	43,741		28,230
Vermont	27,906		20,582
New Brunswick	181,679		142,681
Nova Scotia	67,372		52,373
Prince Edward Island	10,973		6,799
Quebec	101,344		99,329
Total	637,484		484,205
Population deficit (singing males)[2]			
Connecticut		1,520	
Maine		62,358	
Massachusetts		1,996	
New Hampshire		7,493	
New York		14,000	
Vermont		8,702	
New Brunswick		44,191	

Nova Scotia		14,129	
Prince Edward Island		3,105	
Quebec		5,596	
BCR		163,090	
Habitat goal (acres)[3]			
Connecticut		55,527	
Maine		1,912,514	
Massachusetts		74,827	
New Hampshire		268,986	
New York		481,465	
Vermont		394,122	
US sub-total		3,187,441	
New Brunswick		525,426	
Nova Scotia		179,157	
Prince Edward Island		35,116	
Quebec		78,904	
Canada sub-total		818,603	
Total		4,006,044	

[1] Historical time period refers to ca. 1968-1973 for the states and 1979-1985 for Canadian provinces.

[2] The population deficit is not simply the current population of singing males minus the historic level. The deficit considers the density of singing males on manageable acres for each time period.

[3] The habitat goal is calculated as the population deficit multiplied by acreage estimate based on the numbers of singing males heard in each state in the BCR in the 1970's and the amount of early successional habitat at that time. Multipliers ranged from 31 (ME) – 45 (VT) acres in the US and 11 (PEI) – 14 (PQ) acres in Canada.

Table 12. Current forest acreage of forest types by states in BCR 14.

Forest type	Total (% of BCR)	Connecticut	Maine	Massachusetts	New Hampshire	New York	Vermont
Jack pine	5,803 (0.02)	0	5,803	0	0	0	0
Red pine	102,180 (0.35)	0	38,584	0	4,660	49,064	9,872
Eastern white pine	968,473 (3.3)	4,488	433,708	10,367	254,146	152,331	113,432
White pine / hemlock	361,046 (1.2)	0	159,449	20,731	63,374	39,772	77,720
Eastern hemlock	988,727 (3.4)	39,611	252,302	106,755	216,989	120,268	252,802
Balsam fir	2,377,669 (8.1)	0	1,987,215	0	181,281	73,473	135,700
White spruce	180,653 (0.6)	0	180,653	0	0	0	0
Red spruce	1,280,886 (4.4)	0	1,107,133	22,281	106,573	26,522	18,378
Red spruce / balsam fir	1,172,535 (4.0)	0	980,723	0	132,943	15,468	43,400
Black spruce	449,567 (1.5)	0	434,646	0	0	14,921	0
Tamarack	58,848 (0.2)	0	58,848	0	0	0	0
Northern white-cedar	1,032,026 (3.5)	0	967,793	0	0	41,033	23,200
Pitch pine	14,576 (0.05)	0	0	0	14,576	0	0
Scotch pine	18,817 (0.06)	0	0	0	0	18,817	0
Other exotic softwoods	61,303 (0.2)	0	17,583	0	0	22,673	21,047
White pine / red oak / white ash	879,226 (3.0)	34,658	273,234	40,075	259,600	147,908	123,752
Eastern redcedar / hardwood	10,247 (0.04)	0	0	0	0	10,247	0
Other pine / hardwood	15,991 (0.05)	0	15,991	0	0	0	0
White oak / red oak / hickory	436,882 (1.5)	150,023	72,232	27,464	153,801	17,232	16,130
Northern red oak	454,228 (1.6)	39,611	136,371	91,207	144,903	27,326	14,809
Bur oak	6,565 (0.02)	0	0	0	0	6,565	0
Chestnut oak / black oak / scarlet oak	38,765 (0.1)	0	0	20,731	0	0	18,034
Red maple / oak	33,945 (0.1)	0	19,024	0	0	14,921	0
Mixed upland hardwoods	80,331 (0.3)	9,903	18,050	0	3,393	48,985	0

Sweetbay / swamp tupelo / red maple	33,421 (0.1)	0	17,266	0	11,217	0	4,937
Black ash / American elm / red maple	132,680 (0.5)	0	117,759	0	0	14,921	0
River birch / sycamore	16,892 (0.06)	0	16,892	0	0	0	0
Cottonwood	7,398 (0.02)	0	7,398	0	0	0	0
Willow	17,152 (0.06)	0	17,152	0	0	0	0
Sycamore / pecan / American elm	56,085 (0.2)	0	9,299	0	12,505	24,977	9,303
Sugarberry / hackberry / elm / green ash	45,270 (0.2)	0	11,946	0	0	11,290	22,034
Silver maple / American elm	33,054 (0.1)	0	16,286	0	16,768	0	0
Red maple / lowland	171,844 (0.6)	19,806	117,898	0	18,220	15,919	0
Sugar maple / beech / yellow birch	12,647,233 (43.3)	102,486	6,227,050	305,877	2,067,174	1,604,282	2,340,364
Black cherry	75,263 (0.3)	0	5,791	8,931	15,363	45,178	0
Cherry / ash / yellow-poplar	381,203 (1.3)	0	149,137	71,627	50,791	80,758	28,889
Hard maple / basswood	178,223 (0.6)	4,951	15,499	0	14,620	79,940	63,211
Elm / ash / locust	17,969 (0.06)	0	3,121	0	0	10,816	4,033
Red maple / upland	1,329,966 (4.5)	0	499,112	22,281	180,467	317,559	310,547
Aspen	1,185,882 (4.1)	0	931,287	0	37,589	103,551	113,456
Paper birch	1,682,350 (5.8)	0	1,237,076	0	200,947	62,458	181,869
Balsam poplar	122,292 (0.4)	0	93,916	0	13,578	14,798	0
Non stocked	71,121 (0.2)	4,951	46,767	0	13,198	6,205	0
Other	2,503 (.0.01)	0	1,515	0	0	0	987
Total	29,237,090	410,488	16,701,511	748,328	4,188,680	3,240,178	3,947,905

Table 13. Current land area and estimated number of singing male woodcock found in States and Provinces in BCR 14.

State/Province	Total land area in BCR (acres)	Number of singing males		Gain/loss	
		1970	Current	Singing males	Percent
Connecticut	604,525	1,417	541	-876	-62
Maine	21,832,518	101,457	65,730	-35,727	-35
Massachusetts	1,069,446	2,681	1,444	-1,238	-46
New Hampshire	5,230,125	17,800	13,255	-4,546	-26
New York	6,540,326	26,389	17,031	-9,358	-35
Vermont	5,114,656	16,836	12,417	-4,419	-26
U.S. sub-total	40,391,597	166,580	110,417	-56,164	-34
New Brunswick	17,897,795	109,606	86,079	-23,527	-21
Nova Scotia	14,157,199	40,645	31,596	-9,049	-22
Prince Edward Is.	1,489,246	6,620	4,102	-2,518	-38
Quebec	17,364,567	61,141	59,925	-1,216	-2
Canada sub-total	50,908,807	218,012	181,702	-36,310	-17
Total BCR	91,300,404	384,592	292,119	-92,474	-24

Table 14. Physiographic class composition (acres) of the most common forest types found in states within BCR 14.

	Forest Type																	
Physiographic class	Jack pine	Red pine	Eastern white pine	White pine / hemlock	Eastern hemlock	Balsam fir	White spruce	Red spruce	Red spruce / balsam fir	Black spruce	Tamarack	Northern white-cedar	Pitch pine	Scotch pine	Other exotic softwoods	White pine / red oak / white ash	Eastern redcedar / hardwood	Other pine / hardwood
Dry tops	0	0	0	0	0	0	0	8,433	0	0	0	0	0	0	0	0	0	0
Dry slopes	0	0	0	6,759	0	4,561	0	11,584	0	0	0	0	0	0	0	0	0	0
Deep sands	0	0	4,428	0	0	0	0	0	0	0	0	0	0	0	0	13,663	0	0
Other xeric	0	0	0	0	0	0	0	12,404	0	0	0	0	0	0	0	0	0	0
Flatwoods	5,803	61,702	276,387	71,476	80,073	1,327,727	90,223	570,578	630,512	266,835	39,827	542,419	14,576	0	13,195	184,420	10,247	209
Rolling uplands	0	34,492	632,253	263,943	679,717	813,694	72,709	549,012	470,237	25,581	880	156,295	0	18,817	48,108	592,398	0	15,782
Moist slopes and coves	0	5,986	21,561	13,084	169,174	43,903	10,255	68,084	31,827	0	0	27,728	0	0	0	58,844	0	0
Narrow floodplains/bottomlands	0	0	20,181	0	0	38,366	5,971	6,097	5,630	5,986	0	36,028	0	0	0	6,922	0	0
Broad floodplains/bottomlands	0	0	0	0	0	4,651	0	0	0	5,986	0	18,605	0	0	0	5,071	0	0
Other mesic	0	0	0	5,783	27,402	36,994	0	22,621	17,334	5,986	0	23,260	0	0	0	10,758	0	0
Swamps/bogs	0	0	13,663	0	11,290	69,574	1,496	16,423	16,994	104,666	7,863	129,408	0	0	0	1,527	0	0
Small drains	0	0	0	0	21,073	25,996	0	4,218	0	0	4,654	32,749	0	0	0	0	0	0
Bays and wet pocosins	0	0	0	0	0	0	0	11,433	0	19,903	5,623	33,608	0	0	0	0	0	0
Beaver ponds	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other hydric	0	0	0	0	0	12,203	0	0	0	14,624	0	31,925	0	0	0	5,623	0	0
Total	5,803	102,180	968,473	361,046	988,727	2,377,669	180,653	1,280,886	1,172,535	449,567	58,848	1,032,026	14,576	18,817	61,303	879,226	10,247	15,991

Table 15 . Physiographic class composition (acres) of the most common forest types found in states within BCR 14.

	Forest Type																
Physiographic class	White oak / red oak / hickory	Northern red oak	Bur oak	Chestnut oak / black oak / scarlet oak	Red maple / oak	Mixed upland hardwoods	Sweetbay / swamp tupelo / red maple	Black ash / American elm / red maple	River birch / sycamore	Cottonwood	Willow	Sycamore / pecan / American elm	Sugarberry / hackberry / elm / green ash	Silver maple / American elm	Red maple / lowland	Sugar maple / beech / yellow birch	Black cherry
Dry tops	0	14620	0	0	0	0	0	0	0	0	0	0	0	0	0	5,986	0
Dry slopes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	137,447	0
Deep sands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other xeric	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11,159	0
Flatwoods	42,780	31,721	6,565	0	20,544	8,651	0	13,455	2,210	0	10,052	0	0	5,442	626	1,845,437	17,524
Rolling uplands	361,554	349,571	0	38,765	13,401	46,083	0	5,360	9,239	7,398	7,100	0	11,290	0	804	9,613,635	46,305
Moist slopes and coves	12,743	22,281	0	0	0	4,951	0	0	0	0	0	0	0	0	0	837,291	8,931
Narrow floodplains/bottomlands	0	10,771	0	0	0	5,529	11,841	5,717	0	0	0	27,363	29,205	16,768	20,606	16,974	2,503
Broad floodplains/bottomlands	0	0	0	0	0	0	6,413	12,034	0	0	0	9,303	4,774	0	1,446	0	0
Other mesic	19,806	24,107	0	0	0	0	0	0	0	0	0	0	0	0	0	144,633	0
Swamps/bogs	0	0	0	0	0	0	15,166	60,900	5,442	0	0	0	0	10,844	99,851	19,644	0
Small drains	0	1,157	0	0	0	15,116	0	20,476	0	0	0	4,303	0	0	33,372	15,026	0
Bays and wet pocosins	0	0	0	0	0	0	0	5,872	0	0	0	0	0	0	0	0	0
Beaver ponds	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3,644	0	0
Other hydric	0	0	0	0	0	0	0	8,865	0	0	0	15,116	0	0	11,495	0	0
Total	436,882	454,228	6,565	38,765	33,945	80,331	33,421	132,680	16,892	7,398	17,152	56,085	45,270	33,054	171,844	12,647,233	75,263

Table 16. Physiographic class composition (acres) of the most common forest types found in states within BCR 14.

	Forest Type									
Physiographic class	Cherry / ash / yellow-poplar	Hard maple / basswood	Elm / ash / locust	Red maple / upland	Aspen	Paper birch	Balsam poplar	Other	Non stocked	Total
Dry tops	0	0	0	0	0	18,553	0	0	0	47,592
Dry slopes	0	0	0	0	0	17,792	5,630	0	0	183,773
Deep sands	0	0	0	0	0	0	0	0	0	18,091
Other xeric	0	0	0	0	0	0	0	0	0	23,563
Flatwoods	99,646	16,295	5,333	354,279	412,775	517,824	58,604	1,515	24,205	7,681,692
Rolling uplands	213,558	132,192	12,637	913,428	635,584	973,846	43,092	987	23,032	17,832,779
Moist slopes and coves	4,353	14,620	0	50,341	42,574	77,587	5,986	0	0	1,532,104
Narrow floodplains/bottomlands	0	15,116	0	303	46,071	13,404	2,993	0	0	350,345
Broad floodplains/bottomlands	14,576	0	0	0	20,026	5,270	0	0	0	108,155
Other mesic	49,070	0	0	6,121	6,940	25,756	0	0	4,951	431,522
Swamps/bogs	0	0	0	0	11,493	20,856	0	0	10,177	627,277
Small drains	0	0	0	1,088	5,954	6,217	5,986	0	7,288	204,673
Bays and wet pocosins	0	0	0	0	0	1,468	0	0	0	77,907
Beaver ponds	0	0	0	0	0	3,779	0	0	1,468	8,891
Other hydric	0	0	0	4,404	4,465	0	0	0	0	108,720
Total	381,203	178,223	17,969	1,329,966	1,185,882	1,682,350	122,292	2,503	71,121	29,237,084

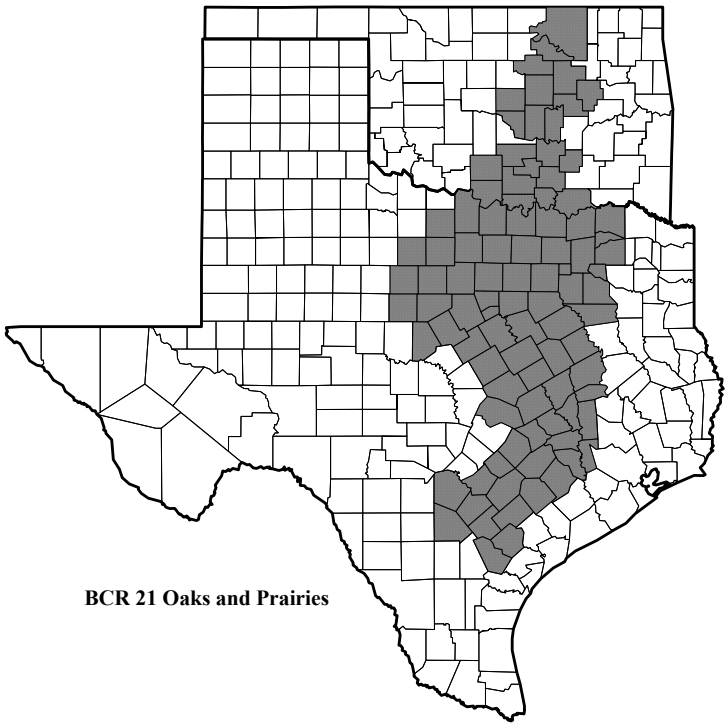
Bird Conservation Region 21: Oaks and Prairies

Affected states: Texas and Oklahoma

Current area of forest land: 2,817,788 acres (678,075 acres of small diameter and non-stocked forest)

Woodcock trend estimate – not applicable (% change/year)

Woodcock density estimate – not applicable



Physiography and Habitat Description

Historical forest inventory data for Oklahmoa is lacking, thus preventing estimation of habitat trends for the state. Early succesional habitat occupies approximately 24% of the timberland in this BCR (Table 1). Texas has experienced a significant loss of early succession forest. Major forest types include post oak/blackjack oak (21%), white oak/red oak/hickory (18%), and loblolly pine (14%; Tables 2-4). Approximately 97% of the 2.8 million acres of timberland in the region is under private ownership (Table 6).

Woodcock Population Status

American woodcock occur over a wide area of the eastern portions of Texas and Oklahoma. The species has been reported in Christmas Bird Counts (CBC) and Breeding Bird Surveys in each state. The CBC has recorded winter sightings of woodcock throughout Oklahoma with the exception of the panhandle and the northwest portion. In Texas, woodcock have been reported

throughout the eastern two-thirds of the state with only the Panhandle, South Plains, Rolling Plains, and Trans-Pecos Regions not having woodcock recorded during the CBC. The bulk of the woodcock population in BCR 21 is east of Interstate 35. Wintering birds are primarily found south of Interstate 20.

The highest densities of woodcock are in extreme eastern Oklahoma and Texas (BCR 25), but woodcock are commonly encountered in adjacent areas of BCR 21. Indeed, the highest densities found in Texas are comparable to those reported in Louisiana where the woodcock is considered a major game bird. Public locations in Texas that have reported woodcock sightings include Hagerman and Attwater Prairie-Chicken National Wildlife Refuges (NWRs), Upper White Rock Creek of Dallas, Lake Tawakoni, Palmetto State Park, Big Thicket National Preserve, Tyrrell Park in Beaumont, Memorial Park in Houston, Spring Creek Park of Harris County, Brazos Bend State Park, W.W. McAllister Park in San Antonio, and many National Forests. However, managers of Little River and Trinity River NWRs in east Texas, respectively, reported that woodcock are rarely seen on their refuges.

Woodcock have been seen in Oklahoma during all seasons, but they are transient in most years. Most woodcock are found in southeast and east-central Oklahoma. The east-central area is drained by the Arkansas River, and the southeast area contains rivers originating in the Ouachita Mountains. Wintering birds can be found in extreme southern Oklahoma.

During the early to mid 1970's, there was an increase in woodcock in Oklahoma due to early successional woody growth occurring on abandoned, previously cleared farmland and pasture, a decrease in wildfire, increasing availability of unused land purchased for speculative purposes, and idle land left following reservoir construction. In fact, birds were found as far west as Salt Plains National Wildlife Refuge during this period. In 1970, American woodcock were found breeding in the Ecology Preserve of Oklahoma State University in Payne County.

Woodcock Harvest

Harvest in east Texas from 1977-2003 was comprised of 26.6% adult males, 37.5% adult females, 17.2% juvenile males, and 18.6% juvenile females. Hunters pursuing woodcock in east Texas generally are successful, with frequent occurrences of harvesting a bag limit. Woodcock hunters in Texas commonly achieve harvest success similar to or greater than the average daily and seasonal bag per hunter in the Central Management Unit, 1.4 and 9.6, respectively. Current reports by hunters indicate that most woodcock harvested in east Texas were found in recently burned, 60-70 year old stands of pines with a grass understory and containing mixed hardwoods on a sandy soil.

However, woodcock harvests in Oklahoma and Texas are likely under reported. Indeed, only 172 and 990 woodcock wings were received from hunters in Oklahoma and Texas, respectively, from 1963-2005 hunting seasons.

It was estimated that in 1975-1976, 2-3,000 woodcock were harvested in Oklahoma. However, recent estimates of harvest in Texas and Oklahoma vary depending on the source. During 1990, in Oklahoma, the state survey estimated 7,200 birds harvested by 2,100 hunters whereas the

Annual Questionnaire Survey of the Service resulted in an estimated harvest of 1,100 birds by 500 hunters. Similarly in Texas during 1990, the state survey estimated that 2,400 hunters harvested 7,700 birds, and the Service reported a harvest of 4,000 by 1,300 hunters.

Habitat Ecology

Woodcock winter habitat requirements can be broken down into 3 components: nocturnal, diurnal, and courtship (from mid-December until migration), with all 3 components required before an area will be used to any extent. Additionally, 3 layers of each habitat type must be evaluated and, if possible, managed: the ground surface, understory, and overstory. A commonly repeated theme is that the structure of habitat is more important than species composition. In the south, measured home ranges for woodcock are reported to be 20 ha for adult males, 11.2 ha for adult females, 10.7 ha for juvenile females, and 16.9 ha for juvenile males.

In general, woodcock are associated with moist areas of regrowth or relatively younger stands of habitat (i.e., early successional) within forests. Birds are usually found in mature forests only if a dense understory is present. Habitat for courtship flights is generally forest openings or fields adjacent to forests, but woodcock displaying in Texas will also use Forest Service roads. There are interactions between cover types, earthworms (primary forage), and the presence of woodcock. Those species commonly associated with woodcock habitat (e.g., alder, hawthorn, birch, ash) typically have leaves with a high nitrogen and sugar contents, which is preferred areas for earthworms eaten by woodcock. Additionally, alder have nitrogen-fixing soil bacteria.

Typically, nocturnal habitats are fields or forest openings where birds can feed: clearcuts, abandoned agriculture fields, pastures, existing crop fields, forest regeneration areas, and other forest openings. Foraging occurs primarily in nocturnal roosting fields during winter. In winter, nocturnal habitats need to be <2 km from diurnal areas. It is recommended that nocturnal winter habitat has sparse ground cover, good soil moisture, and herbaceous or brushy cover at 0.5-1 m tall. Burning should be done to remove ground cover, but must preserve a light overhead canopy of woody stems.

Diurnal habitats are dense, thick understories of early-successional species represented by hawthorn, alder, aspen, or dogwood stands. Generally, areas dominated by coniferous species are only used during periods of drought. Throughout the south, woodcock diurnal habitat is primarily bottomland and adjacent hardwoods with dense stands (closed canopy) of blackberry/dewberry, green briar, supplejack, hawthorn, or water oak thickets. Use of long-leaf pine areas 40-50 years old occurs when bottomlands flood, especially when prescribed fire has been used to enhance the habitat. In the south, larger trees can be part of the overstory of woodcock habitat compared to habitat used further north. Soils are moist, poorly drained, and high in organic matter and earthworms. Prescribed fire is used to reduce ground cover in pinelands, with a fall/early winter burn recommended to aid in creating foraging sites.

In east Texas, diurnal habitat for woodcock is mixed-pine-hardwoods and young pine regeneration areas. They use pine plantation thickets <10 years old, and are commonly found

and nest in "beetle spots" 0.5-2 ha areas of the forest either killed by the southern pine beetle or cleared to remove beetles.

In east Texas, woodcock are commonly found in pine plantations with trees being 1.8-4.7 m tall and where foraging cover is sparse at 0-0.25 m above ground for foraging mobility and much denser at 0.25-0.75 m above ground for protection from predators. Foraging activity was positively correlated with soil moisture, soil pH, and amount of bare soil. Traditionally, woodcock were found in briar patches 3-5 years old since clearing. Recently, it appears that woodcock are making more use of pine plantations especially clearings (0.1-50 acres) associated with southern pine beetles.

In Oklahoma, there is a strong correlation between woodcock occurrence and bottomland habitats and adjacent grasslands. Annual burning and heavy grazing of native pastureland in Oklahoma appears to negatively affect woodcock occurrence. In bottomlands, woodcock are found in areas with some clearings that contain saplings of ash, elm, pecan, and persimmon intermixed with green briar, broadleaf uniola, and bluestem grasses. Plums and roughleaf dogwood thickets will also contain woodcock.

In Oklahoma, rainfall influences habitat use, with the birds moving to uplands when bottomlands flood. When in uplands, woodcock use ungrazed or lightly grazed habitats. Heavy grazing of wooded areas contributes to habitat deterioration. Courtship display areas in Oklahoma are small openings (<1 ha) in the forest.

Fall habitat is generally moist-wet alluvial deposits, within 30-40 m of water, and containing an abundance of worms. Diurnal cover in Oklahoma is within 10 m of water, with moist-wet soil conditions, has approximately 25% vegetation cover, and contains extensive understory and overstory canopy cover. Diurnal cover species associated with breeding woodcock in Oklahoma are eastern redbud (analogous to alder in structure), green briar, broad-leaf uniola, and leafy elephant foot. Nonbreeding birds are found in areas with an overstory of American elm, hackberry, eastern cottonwood, and willow, and a shrubby-short understory that usually includes red mulberry, roughleaf dogwood, sumac, and sapling elm.

Habitat Management

Woodcock management in most areas revolves around small clear cuts (2-5 ha), which can provide all required habitat types as the stand regenerates and ages. Initially, the clear cut will provide nocturnal roost sites and courtship areas, then, as the stand ages, brood rearing habitat, and, finally, diurnal cover. Once the area is no longer used as diurnal cover, the stand is unsuitable for woodcock. It is recommended that every 5-10 years clear areas adjacent to previous cuts with techniques such as shelterwood cuts, group selection (even-aged management), clearcut, or heavy thinnings. Openings for courtship displays have been successfully created by mowing in Oklahoma.

Habitat management activities for nocturnal habitat (roosting fields) should promote earthworms, low use of pesticides, ease of woodcock movement on the ground surface, overstory protection

from predators (especially owls), minimal ground cover with an abundance of exposed soil (ca. 50%), and a canopy of overhead vegetation 0.5-1 m tall.

There currently appears to be limited opportunity for woodcock management on National Wildlife Refuges in the region. However, a considerable amount of woodcock management potential appears to exist on private land, especially paper company forests in east Texas. Observations indicate that woodcock respond favorable to red-cockaded woodpecker management. The following are recommendations for management of pine plantations in east Texas: (1) when working in upland areas, concentrate on sandy soils with high clay and low gravel content; shear or clearcut the area and windrow debris to prepare sites for woodcock, hardwood shrubs will grow in windrows, which will provide escape routes when the pines mature; (3) plant the pines close together in widely spaced rows; (4) conduct a prescribed burn as soon as possible following planting of pine species, using cool winter burns to reduce ground cover without changing mid-story foliage density; and (5) thin the stands early and often.

Table 1. Current and historic (ca. 1970-75) stand-size distribution of forestland in Bird Conservation Region (BCR) 21 and portions of individual states within the BCR. Historic inventory data was not available for Oklahoma.

	Current stand-size distribution (acres)						Historic stand-size distribution (acres)				
Area	Total forestland[1]	Large diameter[2,3]	Medium diameter[2,4]	Small diameter[2,5]	Non-stocked[2,6]		Total forestland[1]	Large diameter[2,3]	Medium diameter[2,4]	Small diameter[2,5]	Non-stocked[2,6]
Oklahoma	1,900,934 (67.5)	503,176 (26.5)	821,794 (43.2)	575,964 (30.3)	0 (0.0)						
Texas	916,854 (32.5)	519,900 (56.7)	294,843 (32.2)	95,214 (10.4)	6,897 (0.8)		1,373,900	497,300 (36.2)	374,100 (27.2)	479,400 (34.9)	23,100 (1.7)
Total BCR	2,817,788 (100.0)	1,023,076 (36.3)	1,116,637 (39.6)	671,178 (23.8)	6,897 (0.2)						

[1] Percentages in parentheses. Percentages for total forestland refer to percent of column total.
[2] Percentages for various diameter categories and non-stocked category refer to percent of total forestland for current and historic time periods within each state.
[3] Softwoods at least 9 inches, and hardwoods at least 11 inches in diameter at breast height.
[4] Trees at least 5 inches in diameter at breast height, but smaller than large diameter.
[5] Saplings 1-5 inches diameter at breast height, plus softwood seedlings more than 6 inches tall and hardwood seedlings more than 12 inches tall.
[6] Commercial forest land on which stocking of trees is less than 16.7 percent.

Table 2. Current composition of major forest types in Bird Conservation Region 21.

Forest Type	Acres	Percent of forestland in BCR
Post oak / blackjack oak	584,280	20.7
White oak / red oak / hickory	509,874	18.1
Loblolly pine	398,015	14.1
Southern scrub oak	213,741	7.6
Oak / Hickory Group	190,031	6.7
Sugarberry / hackberry / elm / green ash	161,314	5.7
Oak / Gum / Cypress Group	131,934	4.7
Shortleaf pine	116,432	4.1
Shortleaf pine / oak	105,814	3.8
Loblolly pine / hardwood	104,933	3.7
Sycamore / pecan / American elm	61,123	2.2
Overcup oak / water hickory	56,773	2.0
Sweetgum / Nuttall oak / willow oak	41,363	1.5
Mixed upland hardwoods	29,109	1.0
Eastern redcedar / hardwood	21,051	0.7
Sweetgum / yellow-poplar	16,005	0.6
River birch / sycamore	15,983	0.6
Willow	13,689	0.5
Sassafras / persimmon	11,691	0.4

Table 3. Stand size class[1] composition (in thousands of acres) of the most common forest types found in states within BCR 21.

	Forest Type																	
Stand size class	Post oak / blackjack oak	White oak / red oak / hickory	Loblolly pine	Southern scrub oak	Oak / Hickory Group	Sugarberry / hackberry / elm / green ash	Oak / Gum / Cypress Group	Shortleaf pine	Shortleaf pine / oak	Loblolly pine / hardwood	Sycamore / pecan / American elm	Overcup oak / water hickory	Sweetgum / Nuttall oak / willow oak	Mixed upland hardwoods	Eastern redcedar / hardwood	Sweetgum / yellow-poplar	River birch / sycamore	Willow
Texas																		
Large	154.0	22.6	41.4	0.0	0.0	11.3	0.0	0.0	18.2	10.5	12.6	20.4	48.0	98.2	13.3	9.3	5.3	0.0
Medium	147.1	0.0	26.5	0.0	0.0	19.7	0.0	0.0	0.0	5.3	5.3	0.0	27.0	25.4	6.9	0.0	4.0	0.0
Small	8.7	2.0	7.0	0.0	0.0	3.5	0.0	0.0	0.0	0.0	0.0	0.0	4.0	40.3	5.3	8.2	0.0	0.0
Oklahoma																		
Large	29.6	75.8	61.7	8.9	59.7	55.0	100.6	35.3	35.3	3.8	24.5	4.7	3.8	0.0	0.0	0.0	0.0	3.1
Medium	77.1	252.3	192.9	113.1	40.0	17.8	7.7	44.5	22.2	5.6	19.3	7.5	0.0	7.8	0.0	0.0	0.0	6.6
Small	36.8	156.0	52.0	91.8	90.3	12.0	23.7	16.7	16.7	50.0	5.1	5.6	0.0	0.0	8.9	0.0	0.0	0.0
Total BCR																		
Large	183.7	98.4	103.2	8.9	59.7	66.3	100.6	35.3	53.4	14.4	37.2	25.1	51.8	98.2	13.3	9.3	5.3	3.1
Medium	224.1	252.3	219.4	113.1	40.0	37.5	7.7	44.5	22.2	10.9	24.7	7.5	27.0	33.2	6.9	0.0	4.0	6.6
Small	45.6	158.1	59.0	91.8	90.3	15.5	23.7	16.7	16.7	50.0	5.1	5.6	4.0	40.3	14.2	8.2	0.0	0.0

Table 4. Stand size class[1] composition (in thousands of acres) of the most common forest types found in states within BCR 21.

	Forest Type																	
Stand size class	Post oak / blackjack oak	White oak / red oak / hickory	Loblolly pine	Southern scrub oak	Oak / Hickory Group	Sugarberry / hackberry / elm / green ash	Oak / Gum / Cypress Group	Shortleaf pine	Shortleaf pine / oak	Loblolly pine / hardwood	Sycamore / pecan / American elm	Overcup oak / water hickory	Sweetgum / Nuttall oak / willow oak	Mixed upland hardwoods	Eastern redcedar / hardwood	Sweetgum / yellow-poplar	River birch / sycamore	Willow
Dry tops	2.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deep sands	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.6	0.0	0.0	0.0	0.0
Flatwoods	31.7	3.5	36.5	0.0	0.0	8.8	0.0	0.0	0.0	0.0	8.6	6.9	29.7	33.3	0.0	0.0	0.0	0.0
Rolling uplands	258.8	20.8	38.5	0.0	0.0	0.0	0.0	8.3	18.2	15.9	0.0	0.0	8.6	94.1	18.6	17.5	0.0	0.0
Moist slopes and coves	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	0.0	0.0	0.0	0.0
Narrow floodplains/ bottomlands	5.3	0.5	0.0	0.0	0.0	9.1	0.0	0.0	0.0	0.0	9.3	13.5	35.3	15.6	0.0	0.0	4.0	0.0
Broad floodplains/ bottomlands	3.2	0.0	0.0	0.0	0.0	16.6	0.0	0.0	0.0	0.0	0.0	0.0	5.3	12.3	0.0	0.0	0.0	0.0
Swamps/bogs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.3	0.0
Small drains	8.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.8	0.0	0.0	0.0
Other xeric	0.0	5.6	22.2	0.0	0.0	0.0	0.0	16.7	5.6	5.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other mesic	143.5	478.5	284.3	213.7	190.0	84.8	131.9	79.8	68.6	53.9	49.0	17.8	3.8	7.8	8.9	0.0	0.0	9.7
Total	453.4	508.8	381.6	213.7	190.0	119.3	131.9	104.7	92.4	75.3	66.9	38.2	82.8	171.7	34.3	17.5	9.3	9.7

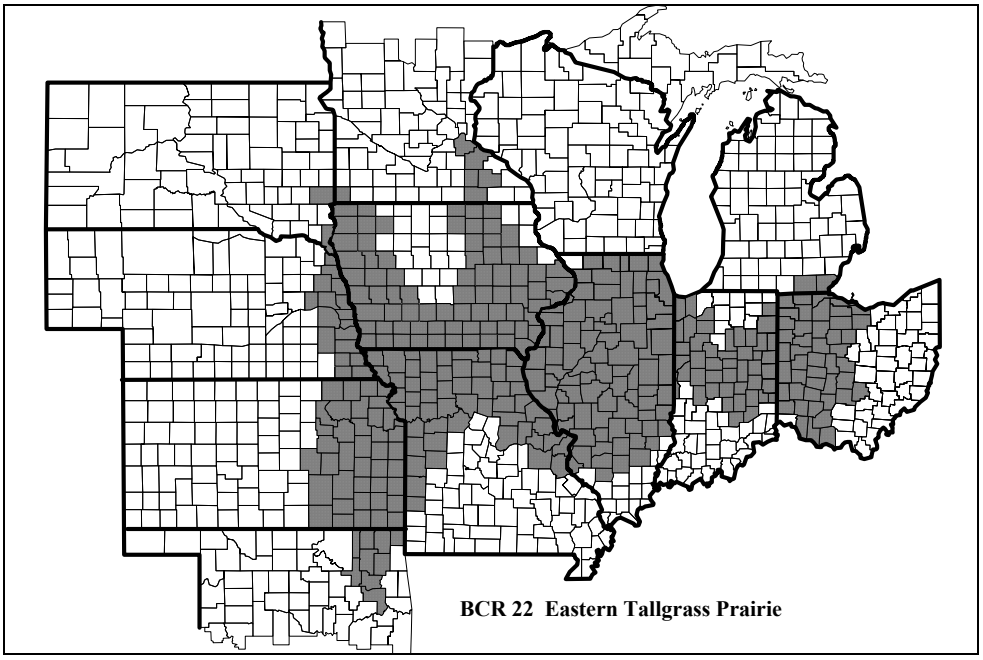
Table 5. Forest ownership categories in Bird Conservation Region 21 (acres; percent of column total in parentheses).			
Ownership	Total BCR	OK	TX
National Forest	42,108 (1.5)	42,108 (2.2)	0 (0.0)
National Park Service	0 (0.0)	0 (0.0)	0 (0.0)
U.S. Fish and Wildlife Service	0 (0.0)	0 (0.0)	0 (0.0)
Department of Defense	0 (0.0)	0 (0.0)	0 (0.0)
Other Federal	39,379 (1.4)	39,379 (2.1)	0 (0.0)
State	5,328 (0.2)	0 (0.0)	5,328 (0.6)
County/Municipal	5,328 (0.2)	0 (0.0)	5,328 (0.6)
Other Local Government	0 (0.0)	0 (0.0)	0 (0.0)
Private	2,725,744 (96.7)	1,819,447 (95.7)	906,198 (98.8)
All	2,817,788 (100.0)	1,900,934 (100.0)	916,854 (100.0)

Bird Conservation Region 22: Eastern Tallgrass Prairie

Affected states: Minnesota, Illinois, Indiana, Ohio, Michigan, South Dakota, Nebraska, Kansas, Missouri, Oklahoma

Current area of forest land: 13,997,738 acres (1,718,525 acres of small diameter and non-stocked forest)

Woodcock trend estimate (% change/year)	1966-2004: - 1.2 1994-2004: 0.9		Woodcock population estimate (singing males only)	1970: 71,506 2004: 62,761



The portions of BCR 22 that lie in Indiana, Ohio, and Michigan are contained in sections 222G (Central Till Plain, Oak Hickory) and 222H (Central Till Plain, Beech-Maple) of the Eastern Broadleaf Forest Province (McNab and Avers 1994). Such areas are generally flat and dominated by agriculture. Of the forested areas, most remnants are on the steepest slopes, poorest soils, or in flood plains too wet for cultivation. Most forested tracts are now second growth woodlots less than 250 acres in size (McNab and Avers 1994). The central and western portions of the BCR are contained in sections 251C (Central Dissected Till Plains) and 251D (Central Till Plains) of the Prairie Parkland Province (McNab and Avers 1994). This region is flat to rolling plains dominated by agriculture. Many streams that formerly meandered across broad valleys have been straightened by channelization and are silted-in from agricultural runoff (McNab and Avers 1994).

Between the current and baseline forest inventories there has been a gain of just over 3 million acres (+ 31%) of forestland in this BCR (Table 1). However, there has been a net loss of over 0.9 million acres (-34%) of small diameter and non-stocked forest during the same period. These comparisons do not include the Oklahoma portion of the BCR, for which historic inventory data was not available. Major forest types include white oak/red oak/hickory (28%), mixed upland hardwood (15%), elm/ash/locust (8%), black ash/American elm/red maple (6%), and white oak (6%; Tables 2-5). Approximately 93% of the 13.4 million acres of forestland in the region is under private ownership. Slightly over 4% of the region is state or county forest, whereas other ownership categories include only minor forestland area (Table 6).

Woodcock Harvest and Population Status

States in BCR 22 are not major contributors to Central Region woodcock harvest compared to states in more northerly BCRs. Ohio ranks as the highest harvest state in the BCR with 4,700 hunters taking approximately 6,900 birds

throughout the state in 2005 (Kelley and Rau 2006). Illinois and Indiana each had approximately 2,100 hunters in 2005 that harvested 3,900 and 4,400 birds, respectively. Other states harvested less than 1,400 birds.

Much of BCR 22 lies on the southwestern edge of the area covered by the Singing-ground Survey (SGS). A large percentage of the BCR in Missouri, Nebraska, Kansas, and Oklahoma is not surveyed and such states were not included in calculations of population and habitat goals. However, un-surveyed states such as Missouri likely serve as important migration corridors. In states covered by the SGS, there has been a long-term woodcock decline of 1.2 %/year in BCR 22 (USGS unpublished data). The total estimate of singing males in surveyed states has declined from approximately 71,500 during the early 1970s, to the current estimate of just under 62,800 birds (Table 7). Interestingly, Illinois currently has a higher estimated population of singing males than the historical period. Illinois was therefore excluded from population deficit calculations for the BCR. The total woodcock population deficit for the BCR is nearly 38,000 singing males (Table 7). The majority (93%) of this deficit is distributed in Indiana and Ohio.

Population and Habitat Goals

To restore woodcock densities in BCR 22 to those observed during the early 1970s, a total of nearly 38,000 additional singing males need to be added to the population (Table 7). This estimate pertains only to manageable acres in states covered by the Singing-ground Survey. Achieving this goal will require the creation of nearly 715,000 acres of new woodcock habitat; primarily in Indiana and Ohio. However, if the management goal is only to replace the total loss of singing males that has occurred since the early 1970s (without regard to density) then approximately 165,000 acres of new woodcock habitat needs to be created in the surveyed portion of the BCR. The vast majority of timberland in this region is under private ownership. Therefore, state and federal resource agencies will need to enlist the help of individual and commercial private forestland owners in order to achieve habitat management goals.

Table 1. Current and historic (ca. 1970-75) stand-size distribution of forestland in Bird Conservation Region (BCR) 22 and portions of individual states within the BCR.

	Current stand-size distribution in acres					Historic stand-size distribution in acres				
Area	Total forestland[1]	Large diameter[2,3]	Medium diameter[2,4]	Small diameter[2,5]	Non-stocked[2,6]	Total forestland[1]	Large diameter[2,3]	Medium diameter[2,4]	Small diameter[2,5]	Non-stocked[2,6]
Minnesota	139,228 (1.0)	74,793 (53.7)	45,210 (32.5)	13,311 (9.6)	5,914 (4.2)	128,600 (1.3)	102,600 (79.8)	24,400 (19.0)	1,600 (1.2)	0 (0.0)
Iowa	1,954,105 (14.0)	1,220,213 (62.4)	444,736 (22.8)	234,144 (12.0)	55,012 (2.8)	1,172,000 (12.0)	606,059 (51.7)	293,023 (25.0)	241,460 (20.6)	31,459 (2.7)
Missouri	3,861,275 (27.6)	2,226,126 (57.7)	1,225,359 (31.7)	393,749 (10.2)	16,041 (0.4)	2,665,500 (27.3)	1,033,200 (38.8)	1,010,100 (37.9)	287,200 (10.8)	326,000 (12.2)
Illinois	2,931,096 (20.9)	2,122,496 (72.4)	546,592 (18.6)	242,801 (8.3)	19,208 (0.7)	2,661,700 (27.2)	1,557,687 (58.5)	670,057 (25.2)	414,471 (15.6)	19,485 (0.7)
Indiana	1,033,421 (7.4)	721,922 (69.9)	230,149 (22.3)	72,221 (7.0)	9,130 (0.9)	822,900 (8.4)	465,100 (56.5)	168,400 (20.5)	165,000 (20.1)	24,400 (3.0)
Ohio	1,663,775 (11.9)	1,131,447 (68.0)	314,979 (18.9)	209,676 (12.6)	7,673 (0.5)	1,225,600 (12.5)	434,812 (35.5)	95,268 (7.8)	678,110 (55.3)	17,411 (1.4)
Michigan	108,676 (0.8)	67,354 (62.0)	30,540 (28.1)	10,781 (9.9)	0 (0.0)	90,700 (0.9)	49,650 (54.7)	14,300 (15.8)	17,350 (19.1)	9,400 (10.4)
South Dakota	3,726 (<0.1)	3,726 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	2,983 (1.5)	2,983 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)
Nebraska	256,289 (1.9)	204,303 (79.7)	35,007 (13.7)	9,900 (3.9)	7,080 (2.8)	148,400 (1.5)	74,000 (49.9)	42,100 (28.4)	32,300 (21.8)	0 (0.0)
Kansas	1,596,247 (12.0)	660,302 (41.4)	622,826 (39.0)	307,890 (19.3)	5,230 (0.3)	950,193 (9.7)	400,150 (42.1)	200,257 (21.1)	321,767 (33.9)	28,019 (2.9)
Oklahoma	449,900 (3.4)	160,819 (35.7)	190,316 (42.3)	98,765 (22.0)	0 (0.0)	na[7]	na[7]	na[7]	na[7]	na[7]
Total BCR	13,997,738 (100.0)	8,593,501 (61.4)	3,685,715 (26.3)	1,593,238 (11.4)	125,287 (0.9)	9,868,576 (100.0)	4,726,240 (47.9)	2,517,904 (25.5)	2,159,257 (21.9)	456,174 (4.6)

[1] Percentages in parentheses. Percentages for total forestland refer to percent of column total.
[2] Percentages for various diameter categories and non-stocked category refer to percent of row total for current and historic time periods.
[3] Softwoods at least 9 inches, and hardwoods at least 11 inches in diameter at breast height.
[4] Trees at least 5 inches in diameter at breast height, but smaller than large diameter.
[5] Saplings 1-5 inches diameter at breast height, plus softwood seedlings more than 6 inches tall and hardwood seedlings more than 12 inches tall.
[6] Commercial forest land on which stocking of trees is less than 16.7 percent.
[7] Historic data not available for BCR 22 portion of Oklahoma

Table 2. Current composition of major forest types in Bird Conservation Region 22.

Forest Type	Acres	Percent of forestland in BCR
White oak/red oak/hickory	3,813,703	28.3
Mixed upland hardwoods	1,993,507	14.8
Elm/ash/locust	1,084,398	8.0
Black ash /American elm /red maple	847,071	6.3
White oak	774,756	5.7
Sugarberry /hackberry /elm /green ash	665,346	4.9
Black cherry	365,750	2.7
Post oak /blackjack oak	362,618	2.7
Red maple/lowland	333,070	2.5
Hard maple / basswood	325,232	2.4
Eastern redcedar	291,598	2.2
Cottonwood	277,421	2.1
Burr oak	222,757	1.7

Table 3. Percent composition of forest types between states within BCR 22.

Forest Type	MN	MI	IN	OH	IL	MO	IA	KS	OK	NE	SD	Total
White oak / red oak / hickory	0.4	0.7	6.4	10.9	27.3	33.6	11.1	6.3	3.0	0.3	0.0	100.0
Mixed upland hardwoods	0.5	0.3	6.4	7.4	19.2	28.9	13.9	21.7	0.0	1.6	0.0	100.0
Sugarberry / hackberry / elm / green ash	2.3	1.5	4.6	4.5	23.4	19.4	18.8	17.0	4.8	3.7	0.0	100.0
White oak	0.0	0.1	4.2	2.1	24.8	52.9	15.9	0.0	0.0	0.0	0.0	100.0
Sugar maple / beech / yellow birch	1.1	1.2	20.5	47.5	12.2	8.9	8.5	0.0	0.0	0.0	0.0	100.0
Silver maple / American elm	1.4	0.5	6.7	2.8	30.3	26.9	31.4	0.0	0.0	0.0	0.0	100.0
Post oak / blackjack oak	0.5	0.1	0.0	0.0	11.2	41.5	1.3	21.3	24.0	0.0	0.0	100.0
Eastern redcedar	1.1	0.0	0.0	18.3	0.0	43.1	8.6	25.8	0.0	3.1	0.0	100.0
River birch / sycamore	0.0	0.0	12.3	9.0	15.0	39.4	11.5	12.8	0.0	0.0	0.0	100.0
Hard maple / basswood	3.6	3.3	12.2	22.5	26.1	12.0	20.2	0.0	0.0	0.0	0.0	100.0
Cottonwood	2.2	4.1	0.0	0.0	17.4	19.0	25.9	26.6	0.0	3.1	1.6	100.0
Eastern redcedar / hardwood	0.0	0.0	2.5	16.9	0.8	47.2	14.0	18.6	0.0	0.0	0.0	100.0
Black walnut	0.9	0.0	20.3	13.5	14.1	14.7	17.8	18.6	0.0	0.0	0.0	100.0
Bur oak	3.8	0.0	2.7	3.6	22.7	2.6	40.4	12.7	0.0	11.5	0.0	100.0
Elm / ash / locust	2.5	0.0	7.7	9.8	15.3	27.9	28.5	0.0	0.0	8.4	0.0	100.0
Cherry / ash / yellow-poplar	0.0	1.1	28.2	36.8	15.7	12.9	5.2	0.0	0.0	0.0	0.0	100.0
Sycamore / pecan / American elm	0.0	0.0	8.2	4.3	24.8	19.8	3.6	21.2	17.9	0.0	0.0	100.0
Northern red oak	2.6	3.4	4.5	16.3	30.9	19.7	14.4	8.2	0.0	0.0	0.0	100.0
Non stocked	5.1	0.0	7.8	6.6	16.4	13.7	47.1	0.0	0.0	3.3	0.0	100.0
Black cherry	0.0	0.0	9.4	33.0	22.9	0.0	2.6	21.7	0.0	10.4	0.0	100.0
Willow	3.6	2.7	0.0	2.5	3.9	24.7	21.0	31.8	9.7	0.0	0.0	100.0

Table 4. Forest composition of timberland within Bird Conservation Region 22 (acres).

Forest Type	MN	MI	IN	OH	IL	MO	IA	KS	OK	NE	SD	Total
White oak / red oak / hickory	17,445	26,240	251,935	428,416	1,076,163	1,323,465	435,964	249,631	120,100	12,035	0	3,941,394
Mixed upland hardwoods	13,063	7,420	168,473	195,318	505,353	759,102	365,099	569,298	1,238	42,975	0	2,627,339
Sugarberry / hackberry / elm / green ash	30,403	19,258	60,496	58,763	305,479	252,723	244,898	222,165	62,213	48,872	0	1,305,270
White oak	0	985	33,153	16,421	195,129	416,961	125,135	0	0	0	0	787,784
Sugar maple / beech / yellow birch	7,802	8,695	145,387	337,264	86,924	63,357	60,657	0	0	0	0	710,086
Silver maple / American elm	6,092	2,357	29,660	12,458	133,831	118,714	138,667	0	0	0	0	441,778
Post oak / blackjack oak	1,992	636	0	0	48,523	179,223	5,535	92,003	103,454	0	0	431,365
Eastern redcedar	3,547	0	0	58,083		136,998	27,508	82,062	0	9,859	0	318,057
River birch / sycamore	0	0	35,341	25,790	42,943	113,079	32,959	36,570	0	0	0	286,681
Hard maple / basswood	9,748	8,856	32,641	60,388	69,883	32,188	54,220	0	0	0	0	267,924
Cottonwood	5,187	9,538	0		40,277	43,903	59,820	61,479	0	7,224	3,726	231,154
Eastern redcedar / hardwood	0	0	5,739	39,237	1,855	109,232	32,468	43,107	0	0	0	231,638
Black walnut	1,998	0	44,677	29,714	31,020	32,220	39,115	40,916	0	0	0	219,660
Bur oak	8,152	0	5,714	7,607	48,415	5,550	86,019	27,013	0	24,483	0	212,952
Elm / ash / locust	5,123	0	15,959	20,209	31,562	57,662	58,860	0	0	17,284	0	206,658
Cherry / ash / yellow-poplar	0	2,268	58,246	76,035	32,498	26,726	10,658	0	0	0	0	206,431
Sycamore / pecan / American elm	0	0	14,594	7,691	43,904	35,034	6,454	37,562	31,771	0	0	177,010
Northern red oak	3,620	4,738	6,400	23,043	43,645	27,820	20,261	11,612	0	0	0	141,138
Non stocked	5,914	0	9,130	7,673	19,208	16,041	55,012	0	0	3,891	0	116,868
Black cherry	0	0	8,675	30,341	21,052	0	2,349	19,921	0	9,552	0	91,891
Willow	2,398	1,835	0	1,696	2,599	16,526	14,042	21,262	6,497	0	0	66,855

Table 5. Stand size class[1] composition (in thousands of acres) of the most common forest types found in states within BCR 22.

	Forest Type																				
Stand size class	White oak / red oak / hickory	Mixed upland hardwoods	Sugarberry / hackberry / elm / green ash	White oak	Sugar maple / beech / yellow birch	Silver maple / American elm	Post oak / blackjack oak	Eastern redcedar	River birch / sycamore	Hard maple / basswood	Cottonwood	Eastern redcedar / hardwood	Black walnut	Bur oak	Elm / ash / locust	Cherry / ash / yellow-poplar	Sycamore / pecan / American elm	Northern red oak	Non stocked	Black cherry	Willow
Ohio																					
Large	346.8	100.6	13.6	16.4	254.9	12.5	0.0	0.0	25.8	57.8	6.2	29.7	20.4	7.6	8.0	15.8	7.7	20.5	0.0	15.4	1.7
Medium	71.5	64.6	30.4	0.0	41.2	0.0	0.0	26.6	0.0	2.6	0.0	0.0	2.6	0.0	0.0	39.5	0.0	2.6	0.0	7.6	0.0
Small	10.1	30.2	14.8	0.0	41.1	0.0	0.0	31.5	0.0	0.0	0.0	9.6	6.7	0.0	12.2	20.8	0.0	0.0	0.0	7.3	0.0
Indiana																					
Large	211.2	91.2	44.5	18.9	123.3	22.2	0.0	0.0	28.7	32.2	0.0	0.0	34.4	6.0	6.2	31.0	14.1	4.2	0.0	0.0	0.0
Medium	25.5	56.5	9.1	12.0	22.4	7.1	0.0	0.0	0.0	0.7	0.0	0.0	5.3	0.0	8.4	36.6	0.0	0.0	0.0	6.5	0.0
Small	14.7	23.2	0.0	0.0	3.1	0.0	0.0	0.0	5.8	1.8	0.0	0.0	3.3	0.0	0.0	7.1	0.0	1.5	0.0	2.2	0.0
Illinois																					
Large	885.3	321.3	159.3	168.6	91.9	143.6	34.1	0.0	31.3	49.1	43.8	0.0	24.2	43.6	18.1	7.1	40.3	50.8	0.0	0.0	1.9
Medium	163.6	185.0	64.2	8.6	11.8	0.0	9.9	8.6	11.9	11.0	0.6	9.2	8.3	2.6	23.9	8.5	7.6	0.0	0.0	8.6	0.0
Small	36.2	79.1	64.0	0.0	14.2	10.8	0.0	0.0	0.0	0.0	0.0	0.0	5.7	1.7	1.9	8.6	0.0	0.0	0.0	8.6	0.0
Michigan																					
Large	30.1	1.2	10.3	0.8	1.5	2.2	0.5	0.0	0.0	4.4	7.5	0.0	0.0	0.0	0.0	0.0	0.0	3.8	0.0	0.0	1.5
Medium	0.7	2.6	5.1	0.0	3.9	1.9	0.0	0.0	0.0	4.5	2.5	1.8	0.0	0.0	0.5	1.8	0.0	0.6	0.0	0.0	0.0
Small	3.9	2.2	0.2	0.0	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Missouri																					
Large	753.9	323.0	146.3	343.2	29.0	97.9	53.4	28.2	70.5	22.1	36.1	41.6	27.8	5.6	14.0	0.0	33.6	32.0	0.0	0.0	3.4
Medium	349.8	336.9	73.5	46.5	24.5	26.8	80.1	48.0	27.1	6.3	6.8	44.6	4.4	0.0	23.7	9.6	0.0	0.0	0.0	0.0	0.0
Small	69.6	121.8	31.5	0.0	6.3	5.8	4.9	40.7	14.6	3.7	0.9	16.1	4.7	0.0	20.0	17.2	1.4	1.6	0.0	0.0	13.1
Iowa																					
Large	268.1	155.2	148.9	115.7	26.3	133.8	5.5	10.0	0.0	49.4	47.7	6.0	37.0	83.5	35.2	0.0	6.2	18.8	0.0	0.0	0.0
Medium	101.1	140.4	82.0	9.4	27.1	3.4	0.0	1.8	0.0	3.3	5.2	8.9	2.1	2.5	13.7	0.0	0.3	1.5	0.0	0.0	0.0
Small	66.7	69.5	14.1	0.0	7.3	1.5	0.0	15.7	0.0	1.4	6.9	17.5	0.0	0.0	10.0	0.0	0.0	0.0	0.0	2.3	0.0
Minnesota																					
Large	12.6	6.0	15.3	0.0	2.6	4.5	1.2	0.0	0.0	9.7	5.0	0.0	0.0	8.2	0.0	0.0	0.0	3.6	0.0	0.0	0.0
Medium	4.9	4.8	13.3	0.0	5.2	1.6	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	5.1	0.0	0.0	0.0	0.0	0.0	0.0
Small	0.0	2.3	1.8	0.0	0.0	0.0	0.8	3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
South Dakota																					
Large	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Medium	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Small	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 5 continued. Stand size class[1] composition (in thousands of acres) of the most common forest types found in states within BCR 22.

	Forest Type																				
Stand size class	White oak / red oak / hickory	Mixed upland hardwoods	Sugarberry / hackberry / elm / green ash	White oak	Sugar maple / beech / yellow birch	Silver maple / American elm	Post oak / blackjack oak	Eastern redcedar	River birch / sycamore	Hard maple / basswood	Cottonwood	Eastern redcedar / hardwood	Black walnut	Bur oak	Elm / ash / locust	Cherry / ash / yellow-poplar	Sycamore / pecan / American elm	Northern red oak	Non stocked	Black cherry	Willow
Nebraska																					
Large	8.5	36.1	37.7	0.0	0.0	4.0	0.0	0.0	0.0	29.8	5.4	0.0	0.0	11.7	11.0	0.0	1.9	0.0	0.0	0.0	0.0
Medium	0.0	22.1	0.0	0.0	7.0	0.0	0.0	7.2	0.0	0.0	0.0	7.2	0.0	9.7	1.9	0.0	0.0	0.0	0.0	0.0	0.0
Small	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Kansas																					
Large	107.8	158.2	135.9	0.0	19.9	10.2	20.5	0.0	29.3	0.0	61.5	22.8	24.1	27.0	4.1	0.0	16.2	0.0	0.0	0.0	0.0
Medium	75.1	319.0	61.0	0.0	0.0	0.0	47.4	27.4	4.9	0.0	0.0	9.9	14.0	0.0	19.8	0.0	21.4	0.0	0.0	0.0	0.0
Small	66.7	92.1	25.3	0.0	0.0	0.0	24.1	54.7	2.4	0.0	0.0	10.4	2.8	0.0	8.2	0.0	0.0	0.0	0.0	0.0	21.3
Oklahoma																					
Large	26.4	1.2	30.8	0.0	0.0	0.0	71.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.8	0.0	0.0	0.0	0.0
Medium	54.7	0.0	18.9	0.0	0.0	0.0	50.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Small	27.9	0.0	0.0	0.0	0.0	0.0	11.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total BCR																					
Large	2,772.4	1,368.5	796.8	675.6	657.2	438.0	187.0	96.2	191.3	259.7	213.2	109.7	185.8	193.1	117.2	157.8	125.7	137.7	12.8	39.0	8.5
Medium	1,307.9	1,202.5	376.1	99.9	457.7	68.3	187.6	93.1	98.5	115.1	21.6	111.3	83.6	28.4	102.8	66.6	51.1	26.8	0.0	24.0	1.7
Small	367.9	488.0	176.4	12.0	93.9	25.2	41.4	142.3	17.0	8.5	7.8	44.0	21.2	1.7	48.5	101.9	1.4	4.2	0.0	25.0	34.4

Table 6. Forest ownership categories in Bird Conservation Region 22 (acres; percent of column total in parentheses).												
Ownership	Total BCR	MN	IA	MO	IL	IN	OH	MI	SD	NE	KS	OK
National Forest	12,081 (0.1)	0 (0.0)	0 (0.0)	12,081 (0.3)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
National Park Service	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
U.S. Fish and Wildlife Service	23,978 (0.2)	0 (0.0)	7,981 (0.4)	0 (0.0)	15,997 (0.5)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Department of Defense	89,474 (0.7)	0 (0.0)	16,057 (0.8)	14,403 (0.4)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	59,014 (3.7)	0 (0.0)
Other Federal	196,514 (1.5)	4,404 (2.9)	43,586 (2.2)	47,845 (1.3)	19,400 (0.7)	23,932 (2.4)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	12,242 (1.3)	45,106 (10.0)
State	398,464 (3.0)	12,771 (8.3)	77,351 (3.8)	161,987 (4.5)	71,805 (2.4)	21,325 (2.1)	21,189 (1.6)	5,904 (5.6)	0 (0.0)	12,035 (4.7)	20,001 (1.3)	0 (0.0)
County/ Municipal	150,671 (1.1)	10,906 (7.1)	14,151 (0.7)	28,498 (0.8)	69,226 (2.3)	0 (0.0)	0 (0.0)	1,476 (1.4)	0 (0.0)	0 (0.0)	27,891 (1.7)	0 (0.0)
Other Local Government	18,893 (0.1)	0 (0.0)	0 (0.0)	1,059 (<0.1)	0 (0.0)	7,976 (0.8)	0 (0.0)	0 (0.0)	0 (0.0)	9,859 (3.8)	0 (0.0)	0 (0.0)
Private	12,482,976 (93.3)	125,346 (81.7)	1,856,228 (92.1)	3,323,945 (92.6)	2,772,850 (94.0)	951,842 (94.7)	1,332,750 (98.4)	97,115 (92.9)	3,726 (100.0)	234,396 (91.5)	1,477,099 (92.5)	404,794 (90.0)
All ownerships	13,373,051 (100.0)	153,427 (100.0)	2,015,354 (100.0)	3,589,817 (100.0)	2,949,277 (100.0)	1,005,075 (100.0)	1,353,939 (100.0)	104,495 (100.0)	3,726 (100.0)	256,289 (100.0)	1,596,247 (100.0)	449,900 (100.0)

Table 7. Calculation of population and habitat goals for American woodcock in Bird Conservation Region 22[1]. Goals developed only for states included in the Singing-ground Survey.			
	Historical[2]		Current
Total land area (acres)			
Minnesota	2,339,488		2,339,488
Illinois	32,459,296		32,459,296
Indiana	11,431,680		11,431,680
Ohio	13,510,195		13,510,195
Michigan	922,458		922,458
Total	60,663,117		60,663,117
Manageable acres			
Minnesota	128,600		139,228
Illinois	2,661,700		2,931,096
Indiana	822,900		1,033,421
Ohio	1,225,600		1,663,775
Michigan	90,700		108,676
Total	4,929,500		5,876,196
Population of singing males			
Minnesota	3,536		3,074
Illinois	18,495		32,302
Indiana	19,273		9,998
Ohio	26,166		14,409
Michigan	4,037		2,978
Total	71,506		62,761
Population deficit (singing males)[3]			
Minnesota		754	
Illinois		No deficit	
Indiana		14,206	
Ohio		21,112	
Michigan		1,859	
Total		37,931	
Habitat goal (acres)[4]			
Minnesota		14,210	
Illinois		0	
Indiana		267,633	
Ohio		397,747	
Michigan		35,025	
Total		714,615	

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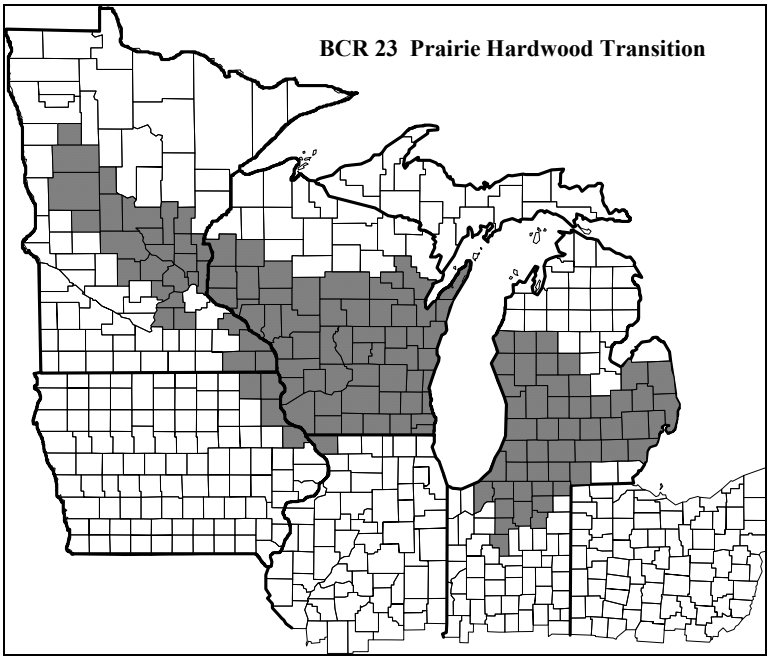
Bird Conservation Region 23: Prairie Hardwood Transition

Affected states: Minnesota, Wisconsin, Iowa, Illinois, Michigan, Indiana

Current area of forest land: 14,768,003 acres (2,505,874 acres of small diameter and non-stocked forest)

Woodcock trend estimate	1968-2004: - 1.0	Woodcock population estimate	1970: 184,612
(% change/year)	1995-2004: - 0.5	(singing males only, excludes IA)	2004: 140,034



Physiography and Habitat Description

The portions of the BCR outside of Minnesota are contained in sections 222I (Erie and Ontario Lake Plain), 222J (South Central Great Lakes), 222K (Southwestern Great Lakes Morainal), and 222L (North-Central U.S. Driftless Escarpment) of the Eastern Broadleaf Forest Province (McNab and Avers 1994). Such areas are a mixture of gently rolling glacial moraines, flat outwash and lacustrine plains. Much of the land has been cleared and drained for agriculture, which is the dominant land use. The Minnesota portion of the BCR is contained primarily in section 251B (North-Central Glaciated Plains) of the Prairie Parkland Temperate Province, which is mostly level to rolling till plain dominated by agriculture (McNab and Avers 1994).

Between the current and baseline forest inventories there has been a gain of nearly 2.4 million acres (+ 19%) of timberland in this BCR (Table 1). However, there has been a net loss of over 1.0 million acres (-30%) of small diameter and non-stocked forest during the same period. Major forest types include white oak/red oak/hickory (18%), sugar maple/beech/yellow birch (10%), aspen (9%), hard maple/basswood (7%), and northern red oak (5%; Tables 2 and 3). Slightly less than 16% of total timberland in the region is comprised of small diameter trees, whereas 34% of the aspen forest type in the region is comprised of small diameter stand size (Table 4). Flatwoods and rolling uplands are the dominant physiographic classes on which major forest types within the region are found (Table 5). Approximately 82% of the 14.3 million acres of timberland in the region is under private ownership. State or county forest comprises approximately 14%, whereas national forest comprises almost 3% of all timberland (Table 6).

Woodcock Harvest and Population Status

BCR 23 is a transitional area between the high density of breeding woodcock in portions of BCR 12 and lower breeding densities to the south. Because Michigan and Wisconsin comprise the majority of the land area within this BCR, those states account for the bulk of woodcock harvest and hunter numbers. Estimates from the Harvest Information Program indicate that 31,200 hunters in Michigan harvested 102,500 birds throughout the state in 2004 (Kelley and Rau 2005). In Wisconsin, nearly 16,000 hunters harvested 47,300 birds statewide. BCR 23 lies in much of central Minnesota. Approximately 14,500 hunters harvested 38,500 woodcock statewide in Minnesota during 2004.

In BCR 23 states covered by the Singing-ground Survey (SGS; all states except Iowa), there has been a long-term woodcock decline of -1.0 %/year (USGS unpublished data). The total estimate of singing males in surveyed states within the BCR has declined from approximately 306,000 during the early 1970s, to the current estimate of slightly over 232,000 birds (Table 7). The total woodcock population deficit for the BCR is nearly 134,000 singing males (Table 7). The majority (83%) of this deficit is distributed in Michigan and Wisconsin.

Population and Habitat Goals

To restore woodcock densities in BCR 23 to those observed during the early 1970s, a total of nearly 134,000 additional singing males need to be added to the population. This estimate pertains only to manageable acres in states covered by the Singing-ground Survey. Achieving this goal will require the creation of slightly over 1.5 million acres of new woodcock habitat; primarily in Michigan, Wisconsin and Minnesota (Table 7). However, if the management goal is only to replace the total loss of singing males that has occurred since the early 1970s (without regard to density) then approximately 856,000 acres of new woodcock habitat needs to be created in the surveyed portion of the BCR. The vast majority of timberland in this region is under private ownership. Therefore, state and federal resource agencies will need to enlist the help of individual and commercial private forestland owners in order to achieve habitat management goals.

Table 1. Current and historical (ca. 1970-75) stand-size distribution of timberland in Bird Conservation Region (BCR) 23 and portions of individual states within the BCR.

	Current stand-size distribution (acres)						Historical stand-size distribution (acres)				
Area	Total timberland[1]	Large diameter[2,3]	Medium diameter[2,4]	Small diameter[2,5]	Non-stocked[2,6]		Total timberland[1]	Large diameter[2,3]	Medium diameter[2,4]	Small diameter[2,5]	Non-stocked[2,6]
Minnesota	2,218,032 (15.0)	1,031,294 (46.5)	750,911 (33.9)	396,939 (17.9)	38,889 (1.8)		1,946,500 (15.8)	847,600 (43.5)	858,900 (44.1)	229,400 (11.8)	10,600 (0.5)
Wisconsin	7,604,561 (51.5)	3,497,852 (46.0)	2,774,698 (36.5)	1,243,911 (16.4)	88,099 (1.2)		6,346,200 (51.4)	1,986,200 (31.3)	2,302,800 (36.3)	1,858,000 (29.3)	199,200 (3.1)
Michigan	4,107,026 (27.8)	2,123,448 (51.7)	1,326,876 (32.3)	615,231 (15.0)	41,470 (1.0)		3,490,950 (28.3)	1,135,900 (32.5)	1,155,200 (32.5)	931,000 (26.7)	246,550 (7.1)
Iowa	404,622 (2.7)	277,566 (68.6)	83,745 (20.7)	41,670 (10.3)	1,641 (0.4)		264,200 (2.1)	169,594 (64.2)	55,688 (21.1)	27,573 (10.4)	11,345 (4.3)
Indiana	341,071 (2.3)	256,791 (75.3)	46,256 (13.6)	30,577 (9.0)	7,447 (2.2)		248,400 (2.0)	139,000 (56.0)	46,700 (18.8)	54,600 (22.0)	8,100 (3.3)
Illinois	92,691 (0.6)	81,251 (87.7)	11,440 (12.3)	0 (0.0)	0 (0.0)		59,700 (0.5)	37,335 (62.5)	14,299 (24.0)	7,618 (12.8)	448 (0.7)
Total BCR	14,768,003 (100.0)	7,268,202 (49.2)	4,993,926 (33.8)	2,328,328 (15.8)	177,546 (1.2)		12,355,950 (100.0)	4,315,630 (34.9)	4,433,587 (35.9)	3,108,190 (25.2)	476,243 (3.9)

[1] Percentages in parentheses. Percentages for total timberland refer to percent of column total.
[2] Percentages for various diameter categories and non-stocked category refer to percent of total forestland for current and historic time periods within each state.
[3] Softwoods at least 9 inches, and hardwoods at least 11 inches in diameter at breast height; size class has more than 50% of stocking in medium and large diameter trees, with stocking of large trees equal to or greater than medium diameter trees.
[4] Trees at least 5 inches in diameter at breast height, but smaller than large diameter; size class has more than 50% of stocking in medium and large diameter trees, with stocking of large diameter trees less than stocking of medium diameter trees .
[5] Saplings 1-5 inches diameter at breast height, plus softwood seedlings more than 6 inches tall and hardwood seedlings more than 12 inches tall; size class has at least 50% of the stocking in small diameter trees.
[6] Commercial forest land on which stocking of trees is less than 16.7 percent.

Table 2. Percent composition of forest types between states within BCR 23.

Forest Type	MN	WI	MI	IA	IN	IL	Total
White oak / red oak / hickory	6.7	56.9	30.2	3.2	3.0	0.0	100.0
Sugar maple / beech / yellow birch	10.5	48.8	33.4	4.4	3.0	0.0	100.0
Aspen	30.8	46.1	23.0	0.0	0.1	0.0	100.0
Hard maple / basswood	34.5	43.7	9.7	9.7	1.4	1.1	100.0
Northern red oak	20.9	46.8	25.0	4.5	1.3	1.6	100.0
Black ash / American elm / red maple	17.4	43.4	36.9	0.1	2.2	0.0	100.0
Sugarberry / hackberry / elm / green ash	15.4	44.2	31.1	3.4	4.2	1.7	100.0
Mixed upland hardwoods	27.3	36.0	23.2	0.0	5.6	7.8	100.0
Red pine	7.4	56.0	35.8	0.0	0.9	0.0	100.0
Post oak / blackjack oak	13.6	56.1	28.7	1.6	0.0	0.0	100.0
White oak	2.9	44.9	45.3	6.5	0.4	0.0	100.0
Elm / ash / locust	20.5	43.9	26.7	7.7	1.2	0.0	100.0
Jack pine	14.9	67.4	17.7	0.0	0.0	0.0	100.0
Paper birch	27.9	66.3	5.8	0.0	0.0	0.0	100.0
Other pine / hardwood	8.4	64.8	21.9	0.0	0.5	4.3	100.0
Eastern white pine	3.8	77.7	18.5	0.0	0.0	0.0	100.0
Red maple / upland	8.4	59.8	31.8	0.0	0.0	0.0	100.0
Red maple / oak	5.3	58.9	31.9	0.0	3.9	0.0	100.0
White pine / red oak / white ash	8.2	66.4	25.3	0.0	0.0	0.0	100.0
Silver maple / American elm	5.5	41.9	46.9	1.1	4.6	0.0	100.0
Non stocked	21.5	50.6	22.9	0.9	4.1	0.0	100.0

Table 3. Forest composition of timberland within Bird Conservation Region 23 (acres; percent of column total in parentheses).							
Forest Type	MN	WI	MI	IA	IN	IL	Total
White oak / red oak / hickory	173,643 (7.8)	1,469,810 (20.5)	779,078 (19.0)	81,484 (20.1)	76,841 (22.5)	665 (0.7)	2,581,521 (18.0)
Sugar maple / beech / yellow birch	148,773 (6.7)	693,672 (9.7)	475,874 (11.6)	62,285 (15.4)	42,163 (12.4)	0 (0.0)	1,422,767 (9.9)
Aspen	411,557 (18.6)	615,225 (8.6)	306,659 (7.5)	0 (0.0)	1,910 (0.6)	0 (0.0)	1,335,351 (9.3)
Hard maple / basswood	339,282 (15.3)	430,031 (6.0)	95,059 (2.3)	95,463 (23.6)	13,558 (4.0)	10,868 (11.7)	984,262 (6.9)
Northern red oak	142,324 (6.4)	318,412 (4.4)	170,112 (4.1)	30,513 (7.5)	8,622 (2.5)	10,877 (11.7)	680,860 (4.8)
Black ash / American elm / red maple	110,162 (5.0)	273,872 (3.8)	232,828 (5.7)	947 (0.2)	13,924 (4.1)	0 (0.0)	631,732 (4.4)
Sugarberry / hackberry / elm / green ash	94,690 (4.3)	271,866 (3.8)	191,349 (4.7)	21,029 (5.2)	26,090 (7.6)	10,200 (11.0)	615,225 (4.3)
Mixed upland hardwoods	156,731 (7.1)	206,603 (2.9)	133,274 (3.2)	0 (0.0)	31,909 (9.4)	44,762 (48.3)	573,279 (4.0)
Red pine	40,164 (1.8)	303,240 (4.2)	193,891 (4.7)	0 (0.0)	4,636 (1.4)	0 (0.0)	541,931 (3.80)
Post oak / blackjack oak	55,936 (2.5)	231,176 (3.2)	118,225 (2.9)	6,679 (1.7)	0 (0.0)	0 (0.0)	412,015 (2.9)
White oak	11,161 (0.5)	169,928 (2.4)	171,428 (4.2)	24,470 (6.0)	1,692 (0.5)	0 (0.0)	378,679 (2.6)
Elm / ash / locust	57,082 (2.6)	122,261 (1.7)	74,461 (1.8)	21,592 (5.3)	3,384 (1.0)	0 (0.0)	278,779 (1.9)
Jack pine	39,545 (1.8)	178,768 (2.5)	46,897 (1.1)	0 (0.0)	0 (0.0)	0 (0.0)	265,210 (1.9)
Paper birch	67,113 (3.0)	159,624 (2.2)	14,076 (0.3)	0 (0.0)	0 (0.0)	0 (0.0)	240,813 (1.7)
Other pine / hardwood	18,690 (0.8)	143,327 (2.0)	48,543 (1.2)	0 (0.0)	1,036 (0.3)	9,599 (10.4)	221,194 (1.50)
Eastern white pine	8,325 (0.4)	170,464 (2.4)	40,581 (1.0)	0 (0.0)	0 (0.0)	0 (0.0)	219,371 (1.5)
Red maple / upland	17,809 (0.8)	127,425 (1.8)	67,739 (1.6)	0 (0.0)	0 (0.0)	0 (0.0)	212,973 (1.5)
Red maple / oak	11,241 (0.5)	123,751 (1.7)	66,963 (1.6)	0 (0.0)	8,273 (2.4)	0 (0.0)	210,227 (1.5)
White pine / red oak / white ash	16,534 (0.7)	133,452 (1.9)	50,877 (1.2)	0 (0.0)	0 (0.0)	0 (0.0)	200,863 (1.4)
Silver maple / American elm	10,985 (0.5)	83,641 (1.2)	93,737 (2.3)	2,188 (0.5)	9,174 (2.7)	0 (0.0)	199,726 (1.4)
Non stocked	38,889 (1.8)	91,686 (1.3)	41,470 (1.0)	1,641 (0.4)	7,447 (2.2)	0 (0.0)	181,133 (1.3)
Other	247,396 (11.2)	842,130 (11.8)	693,906 (16.9)	56,330 (13.9)	90,411 (26.5)	5,720 (6.2)	1,935,895 (13.5)

Table 4. Stand size class[1] composition (in thousands of acres) of the most common forest types found in states within BCR 23.

	Forest Type																				
Stand size class	White oak / red oak / hickory	Sugar maple / beech / yellow birch	Aspen	Hard maple / basswood	Northern red oak	Black ash / American elm / red maple	Sugarberry / hackberry / elm / green ash	Mixed upland hardwoods	Red pine	Post oak / blackjack oak	White oak	Elm / ash / locust	Jack pine	Paper birch	Other pine / hardwood	Eastern white pine	Red maple / upland	Red maple / oak	White pine / red oak / white ash	Silver maple / American elm	All forest types
Minnesota																					
Large	121.0	79.7	73.3	228.0	116.4	23.2	21.4	85.7	11.2	35.3	11.2	22.1	9.3	16.8	7.7	5.3	7.7	0.0	8.9	9.4	1,031.3
Medium	46.0	58.0	174.9	103.3	24.2	58.7	51.0	53.6	21.3	6.8	0.0	23.4	26.5	30.0	2.6	3.0	5.0	0.0	5.0	1.6	750.9
Small	6.7	11.1	163.4	8.0	1.7	28.3	22.3	17.5	7.7	13.9	0.0	11.5	3.8	20.3	8.4	0.0	5.1	11.2	2.6	0.0	396.9
Wisconsin																					
Large	877.7	378.9	89.7	313.1	268.7	58.1	85.7	91.6	149.1	116.4	142.8	17.9	49.0	31.1	53.8	114.7	44.0	46.6	62.0	68.5	3,363.9
Medium	478.0	257.0	304.3	108.9	37.0	165.9	133.8	72.2	114.3	93.7	20.2	63.8	64.4	92.6	52.0	29.6	59.4	58.7	47.3	14.2	2,569.5
Small	114.1	57.8	221.3	8.1	12.6	49.9	52.3	42.8	39.8	21.0	6.9	40.6	65.4	35.9	37.5	26.1	24.0	18.5	24.2	0.9	1,135.3
Michigan																					
Large	514.6	285.8	65.3	69.9	138.1	94.4	90.8	39.0	93.8	67.0	131.8	18.4	12.1	0.0	24.8	29.7	38.7	30.5	25.9	80.5	2,123.4
Medium	200.5	132.6	166.6	18.3	27.9	98.9	61.1	40.9	93.4	36.8	23.2	36.2	27.1	9.4	13.2	10.1	23.8	32.5	21.3	7.5	1,326.9
Small	64.0	57.5	74.8	6.9	4.1	39.5	39.4	53.3	6.7	14.4	16.4	19.9	7.7	4.6	10.5	0.8	5.3	4.0	3.6	5.8	615.2
Iowa																					
Large	47.5	29.3	0.0	79.2	30.5	0.0	15.0	0.0	0.0	5.1	24.5	4.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	277.6
Medium	34.0	19.6	0.0	16.2	0.0	0.9	0.0	0.0	0.0	1.5	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	83.7
Small	0.0	13.4	0.0	0.0	0.0	0.0	6.0	0.0	0.0	0.0	0.0	16.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	41.7
Illinois																					
Large	47.5	29.3	0.0	79.2	30.5	0.0	15.0	0.0	0.0	5.1	24.5	4.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	81.3
Medium	34.0	19.6	0.0	16.2	0.0	0.9	0.0	0.0	0.0	1.5	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.4
Small	0.0	13.4	0.0	0.0	0.0	0.0	6.0	0.0	0.0	0.0	0.0	16.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Indiana																					
Large	72.3	36.4	1.9	10.5	8.6	12.5	16.4	25.3	4.6	0.0	1.7	3.4	0.0	0.0	0.0	0.0	0.0	6.8	0.0	4.9	256.8
Medium	4.5	5.7	0.0	3.0	0.0	1.4	0.0	5.1	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.5	0.0	4.3	46.3
Small	0.0	0.0	0.0	0.0	0.0	0.0	9.7	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	30.6
Total BCR																					
Large	1,633.8	810.1	230.2	711.7	573.3	188.1	239.5	274.9	258.8	223.9	311.9	66.1	70.4	48.0	95.9	149.7	90.4	83.8	96.8	165.4	7,134.2
Medium	763.0	472.9	645.7	249.7	89.2	325.9	246.0	183.2	229.0	138.8	43.5	124.7	118.0	132.0	68.9	42.8	88.2	92.7	73.6	27.6	4,788.7
Small	184.7	139.7	459.5	22.9	18.4	117.7	129.7	115.1	54.2	49.3	23.3	88.1	76.8	60.8	56.4	26.9	34.4	33.7	30.4	6.7	2,219.8

Large diameter trees: hardwoods at least 11 inches diameter, 9 inches for softwoods; size class has more than 50% of stocking in medium and large diameter trees, with stocking of large trees equal to or greater than medium diameter trees. **Medium diameter** trees: trees at least 5 inches diameter but not as large as large diameter trees; size class has more than 50% of stocking in medium and large diameter trees, with stocking of large diameter trees less than stocking of medium diameter trees. **Small diameter** trees: trees less than 5 inches diameter; size class has at least 50% of the stocking in small diameter trees.

Table 5. Physiographic class composition (in thousands of acres) of the most common forest types found in states within BCR 23.

	Forest Type																			
Physio-graphic class	White oak / red oak / hickory	Sugar maple / beech / yellow birch	Aspen	Hard maple / basswood	Northern red oak	Black ash / American elm / red maple	Sugarberry / hackberry / elm / green ash	Mixed upland hardwoods	Red pine	Post oak / blackjack oak	White oak	Elm / ash / locust	Jack pine	Paper birch	Other pine / hardwood	Eastern white pine	Red maple / upland	Red maple / oak	White pine / red oak / white ash	Silver maple / American elm	All forest types
Dry tops	6.9	0.0	0.0	0.0	3.6	0.0	0.0	3.6	2.6	5.3	0.9	2.3	1.9	0.0	0.8	0.0	0.0	0.0	0.0	0.0	31.2
Dry slopes	64.7	7.1	6.3	6.3	12.7	0.0	0.0	1.6	6.8	0.0	4.1	3.6	3.4	0.0	3.8	2.9	2.7	3.5	0.0	0.0	148.4
Deep sands	195.6	16.2	73.3	9.3	58.9	2.8	0.0	8.4	236.5	68.3	46.2	0.0	156.7	0.0	80.8	32.3	5.2	16.1	38.5	0.0	1,242.2
Other xeric	2.4	0.0	4.2	2.3	0.0	0.0	0.0	1.3	18.9	7.0	0.0	0.0	3.9	0.0	7.5	0.0	0.0	0.0	2.8	0.0	52.7
Flatwoods	627.3	568.4	544.0	268.1	146.3	75.2	44.5	191.1	158.0	144.8	123.4	150.3	68.8	35.3	76.0	88.0	151.0	137.4	83.7	27.1	4,208.5
Rolling uplands	1,449.7	648.2	442.3	562.9	398.0	4.3	93.2	258.5	96.8	156.2	181.1	85.6	14.5	132.9	33.5	68.0	33.9	42.8	48.9	1.2	5,216.0
Moist slopes and coves	112.8	52.7	22.0	45.1	10.7	0.0	0.0	9.1	1.7	6.1	1.2	7.1	2.7	3.5	6.4	3.6	3.6	0.0	7.9	1.7	328.6
Narrow floodplains/ bottomlands	7.3	20.4	16.4	27.6	5.5	110.9	167.8	17.7	0.8	3.4	3.7	0.0	0.0	17.7	0.0	0.0	0.0	0.0	0.0	59.9	626.4
Broad floodplains/ bottomlands	9.7	3.4	15.8	0.0	4.0	65.5	83.7	7.2	4.6	0.6	2.1	1.2	0.0	7.6	0.0	0.0	0.0	0.0	0.0	62.0	343.0
Other mesic	86.4	81.9	90.5	44.3	38.3	21.7	20.2	53.3	9.7	7.6	13.7	28.7	4.0	7.0	5.8	2.3	16.7	10.4	7.6	4.3	658.7
Swamps/bogs	2.7	6.2	22.5	0.0	2.8	106.7	44.4	0.9	0.0	4.1	0.0	0.0	3.6	22.9	0.0	7.4	0.0	0.0	0.0	11.4	398.2
Small drains	0.6	0.0	17.2	2.5	0.0	35.7	65.4	8.9	0.0	3.4	0.0	0.0	0.0	5.3	0.0	0.0	0.0	0.0	2.5	9.9	203.6
Bays and wet pocosins	7.5	12.1	57.3	7.1	0.0	157.8	52.5	0.7	5.3	5.3	0.0	0.0	5.7	8.6	3.6	14.8	0.0	0.0	6.3	5.4	621.2
Beaver ponds	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cypress ponds	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other hydric	5.2	6.3	20.2	3.5	0.0	48.5	40.0	3.4	0.0	0.0	2.3	0.0	0.0	0.0	3.0	0.0	0.0	0.0	2.7	15.9	208.7
Unavailable	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.4

Table 6. Forest ownership categories in Bird Conservation Region 23 (acres; percent of column total in parentheses).							
Ownership	Total BCR	MN	WI	MI	IA	IN	IL
National Forest	422,336 (2.9)	0 (0.0)	131,545 (1.8)	290,792 (7.1)	0 (0.0)	0 (0.0)	0 (0.0)
National Park Service	2,106 (<0.1)	0 (0.0)	2,106 (<0.1)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
U.S. Fish and Wildlife Service	113,296 (0.8)	35,543 (1.6)	75,564 (1.1)	0 (0.0)	2,188 (0.5)	0 (0.0)	0 (0.0)
Dept. of Defense	71,114 (0.5)	14,518 (0.6)	53,842 (0.8)	2,755 (0.1)	0 (0.0)	0 (0.0)	0 (0.0)
Other Federal	38,467 (0.3)	19,727 (0.9)	9,038 (0.1)	9,703 (0.2)	0 (0.0)	0 (0.0)	0 (0.0)
State	1,137,909 (7.9)	269,080 (12.1)	407,440 (5.7)	390,829 (9.5)	59,264 (14.6)	11,296 (3.3)	0 (0.0)
County/Municipal	853,627 (6.0)	122,050 (5.5)	595,861 (8.3)	129,355 (3.1)	1,782 (0.4)	4,579 (1.3)	0 (0.0)
Other Local Government	4,624 (< 0.1)	941 (<0.1)	0 (0.0)	3,683 (0.1)	0 (0.0)	0 (0.0)	0 (0.0)
Private	11,680,328 (81.5)	1,756,174 (79.2)	5,884,970 (82.2)	3,279,910 (79.9)	341,388 (84.4)	325,196 (95.3)	92,691 (100.0)
All	14,323,806 (100.0)	2,218,032 (100.0)	7,160,365 (100.0)	4,107,026 (100.0)	404,622 (100.0)	341,071 (100.0)	92,691 (100.0)

Table 7. Calculation of population deficits and habitat goals for American woodcock in Bird Conservation Region 23[1].			
	Historical[2]		Current
Total land area (acres)			
Minnesota	12,858,829		12,858,829
Wisconsin	27,502,970		27,502,970
Michigan	19,948,467		19,948,467
Illinois	395,981		395,981
Indiana	3,070,157		3,070,157
Total	63,776,403		63,776,403
Manageable acres			
Minnesota	1,946,500		2,218,032
Wisconsin	6,346,200		7,604,561
Michigan	3,490,950		4,107,026
Illinois	59,700		92,691
Indiana	248,400		341,071
Total	12,355,950		14,768,003
Population of singing males			
Minnesota	48,226		42,781
Wisconsin	114,890		84,519
Michigan	134,278		99,832
Illinois	599		481
Indiana	8,012		4,502
Total	306,005		232,114
Population deficit (singing males)[3]			
Minnesota		12,172	
Wisconsin		53,152	
Michigan		58,143	
Illinois		449	
Indiana		6,499	
Total		133,627	
Habitat goal (acres)[4]			
Minnesota		141,078	
Wisconsin		616,032	
Michigan		673,879	
Illinois		5,204	
Indiana		75,324	
Total		1,548,742	

[1] Iowa is not included in the Singing-ground Survey and therefore is not included in calculations for the BCR.

[2] Historical time period refers to ca. 1970-75.

[3] The population deficit is not simply the historical population of singing males minus the current level. The deficit considers the density of singing males on manageable acres for each time period.

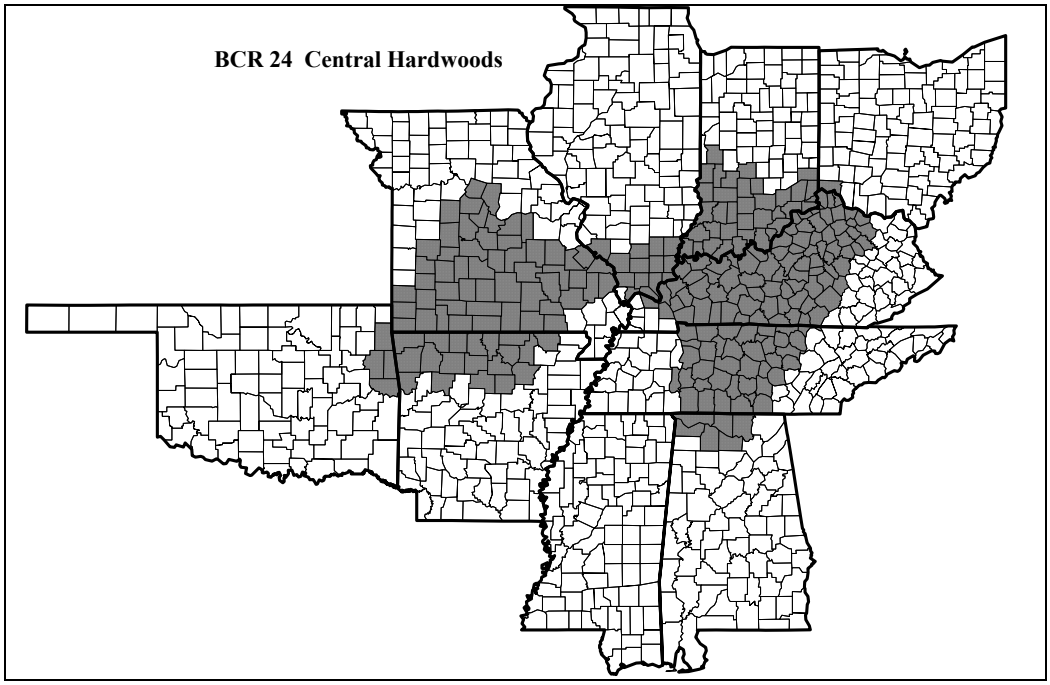
[4] The habitat goal is calculated as the population deficit multiplied by the historical number of acres of early successional habitat per singing male (11.59 acres ESH/singing male).

Bird Conservation Region 24: Central Hardwoods

Affected states: Missouri, Illinois, Indiana, Ohio, Kentucky, Tennessee, Alabama, Arkansas, Oklahoma

Current area of forest land: 31,790,660 acres (3,324352 acres of small diameter and non-stocked forest)

Woodcock trend estimate (% change/year)	1966-2004: 3.0 1994-2004: 9.2		Woodcock population estimate (singing males only)	1970: 15,856 2004: 11,977



BCR 24 includes sections 222A (Ozark Highlands), 222D-F (Interior Low Plateau), and 222G-H (Central Till Plain). These areas on either side of the Mississippi River are similar to each other and are dominated by oak-hickory deciduous forests. This region comprises the most extensive forests in the middle of the continent. Many large rivers occupy the region and along these rivers occur a diversity of floodplain and bottomland forest types as well as emergent wetlands. Threats to the habitats of the region include agricultural conversion and urbanization.

Between the current and baseline forest inventories there has been a loss of nearly 4.6 million acres (-13%) of timberland in this BCR (Table 1). Too, there was a major loss of over 1.2 million acres (-79%) of small diameter and non-stocked forest during the same period. Major forest types include post oak / blackjack oak (7%), white oak (5%), and eastern red cedar / hardwood (5%; tables 2 and 3). About 11% of total timberland in the region is comprised of small diameter trees (Table 4). Rolling uplands and dry slopes are the dominant physiographic classes on which major forest types within the region are found (Table 5). Around 86% of the 32.7 million acres of timberland in the region is under private ownership. Federal lands comprise 11%, whereas state or county lands comprise 3% of all timberland (Table 6).

Woodcock Harvest and Population Status

Only a part of BCR 24 is included in the Singing-ground Survey (SGS). These areas include southern Illinois, Indiana, and Ohio. This region was probably never an important source of woodcock production.

For the portion of BCR 24 covered by the SGS there has been a long-term woodcock increase of 3%/year. The total estimate of singing males in survey states within the BCR has declined from 15,856 during the early 1970's to the current estimate of 11,977 birds (Table 7). Illinois has experienced in increase in singing males and therefore does not have a population deficit. Although there has been an absolute decline in Ohio, at least on a density basis the state does not have woodcock population deficit. The population deficit for Indiana is 8,043 singing males (Table 7).

Habitat Goals

As mentioned above, Illinois and Ohio do not have population deficits. Approximately 509,000 acres of new habitat is needed to eliminate the population deficit in Indiana (Table 7). This estimate pertains only to manageable acres in areas covered by the SGS. In BCR 24, the majority of timberland is under private ownership. Therefore, state and federal resource agencies will need to enlist the help of individual and commercial private forestland owners in order to achieve habitat management goals.

The focus of these habitat improvement efforts will have to be a significant increase in non-stocked and small diameter tree classes. Old field management by Federal and state agencies will have to be a priority as it seems that the loss of small diameter and non-stocked classes was a result of private forest owner decisions. The BCR has a wide variety of forest types, none of which is predominant (<10% coverage). Most of these forest types occur on drier sites that are not typically thought of as better woodcock breeding areas. Possibly managing mesic sites for woodcock will be a strategy.

Table 1. Current and historic (ca. 1970-76) stand-size distribution of forestland in Bird Conservation Region (BCR) 24 and portions of individual states within the BCR.

	Current stand-size distribution (acres)						Historic stand-size distribution (acres)				
Area	Total forestland[1]	Large diameter[2,3]	Medium diameter[2,4]	Small diameter[2,5]	Non-stocked[2,6]		Total forestland[1]	Large diameter[2,3]	Medium diameter[2,4]	Small diameter[2,5]	Non-stocked[2,6]
Alabama	1,067,911	448,222	358,121	261,568	0		996,200	237,200	433,300	325,700	0
	(3.4)	(2.6)	(3.2)	(8.1)	(0.0)		(2.7)	(2.5)	(3.9)	(3.6)	(0.0)
Arkansas	4,991,672	2,330,897	2,243,729	417,046	0		5,179,700	672,800	1,319,500	3,175,900	11,500
	(15.7)	(13.4)	(20.2)	(13.0)	(0.0)		(14.2)	(7.1)	(11.8)	(34.9)	(0.2)
Illinois	1,064,802	739,739	272,254	50,871	1,938		2,454,200	1,330,900	643,800	446,100	33,400
	(3.3)	(4.3)	(2.4)	(1.6)	(1.7)		(6.7)	(14.1)	(5.8)	(4.9)	(0.5)
Indiana	3,076,225	2,325,113	500,564	239,874	10,674		2,824,500	1,432,400	650,600	705,700	35,800
	(9.7)	(13.4)	(4.5)	(7.5)	(9.5)		(7.8)	(15.2)	(5.8)	((7.7)	(0.5)
Kentucky	5,755,247	3,421,130	1,700,734	583,543	49,840		9,629,000	1,505,400	2,100,300	14,600	6,008,700
	(18.1)	(19.7)	(15.3)	(18.2)	(44.3)		(26.5)	(16.0)	(18.8)	(0.2)	(89.7)
Missouri	10,259,771	5,024,508	4,134,616	1,059,121	41,526		9,406,700	2,835,000	3,849,800	2,138,300	583,600
	(32.3)	(29.0)	(37.1)	(33.0)	(36.9)		(25.8)	(30.1)	(34.5)	(23.5)	(8.7)
Ohio	94,965	66,764	25,637	2,564	0		927,600	349,500	32,600	535,100	10,400
	(0.3)	(0.4)	(0.2)	(<0.1)	(0.0)		(2.5)	(3.7)	(0.3)	(5.9)	(0.2)
Tennessee	5,480,067	2,974,686	1,899,594	597,180	8,607		4,983,100	1,069,600	2,133,500	1,765,200	14,800
	(17.2)	(17.2)	(17.1)	(18.6)	(7.6)		(13.7)	(11.3)	(19.1)	(19.4)	(0.2)
Total BCR	31,790,660	17,331,059	11,135,249	3,211,767	112,585		36,401,000	9,432,800	11,163,400	9,106,600	6,698,200
	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)		(100.0)	(100.0)	(100.0)	(100.0)	(100.0)

[1] Percentages in parentheses. Percentages for total forestland refer to percent of column total.
[2] Percentages for various diameter categories and non-stocked category refer to percent of total forestland for current and historic time periods within each state.
[3] Softwoods at least 9 inches, and hardwoods at least 11 inches in diameter at breast height.
[4] Trees at least 5 inches in diameter at breast height, but smaller than large diameter.
[5] Saplings 1-5 inches diameter at breast height, plus softwood seedlings more than 6 inches tall and hardwood seedlings more than 12 inches tall.
[6] Commercial forest land on which stocking of trees is less than 16.7 percent.

Table 2. Percent composition of forest types between states within BCR 24.										
Forest Type	AL	AR	IL	IN	KY	MO	OH	OK	TN	TOTAL
White oak / red oak / hickory	1.6%	18.0%	2.9%	6.5%	17.7%	35.3%	0.0%	3.6%	14.5%	100.0%
Mixed upland hardwoods	7.6%	12.1%	2.4%	9.1%	9.7%	16.2%	1.2%	0.0%	41.7%	100.0%
Post oak / blackjack oak	0.8%	26.2%	0.5%	0.0%	2.7%	56.3%	0.0%	11.3%	2.1%	100.0%
White oak	2.1%	6.8%	2.1%	8.6%	3.6%	65.6%	0.0%	0.0%	11.1%	100.0%
Eastern redcedar / hardwood	1.2%	18.2%	0.5%	4.2%	27.6%	27.0%	0.0%	0.0%	21.3%	100.0%
Eastern redcedar	0.0%	23.2%	1.9%	3.5%	17.8%	38.2%	0.0%	0.0%	15.3%	100.0%
Sugarberry / hackberry / elm / green ash	10.1%	3.9%	11.5%	7.2%	33.4%	14.0%	0.0%	0.8%	19.2%	100.0%
Yellow-poplar / white oak / red oak	1.4%	0.0%	1.4%	24.9%	22.1%	0.0%	0.0%	0.0%	50.3%	100.0%
Sugar maple / beech / yellow birch	1.3%	0.0%	5.4%	52.3%	26.5%	11.0%	1.7%	0.0%	1.8%	100.0%
Sweetgum / yellow-poplar	11.5%	2.0%	7.5%	11.9%	32.9%	0.4%	0.0%	33.8%	0.0%	100.0%
Shortleaf pine	0.0%	50.8%	5.5%	2.7%	1.1%	36.5%	0.0%	3.0%	0.4%	100.0%
Chestnut oak	3.9%	0.0%	0.0%	11.9%	33.7%	0.0%	0.0%	0.0%	50.4%	100.0%
White pine / red oak / white ash	0.0%	16.8%	0.0%	3.3%	50.0%	0.7%	0.0%	0.0%	29.1%	100.0%
Virginia pine / southern red oak	5.6%	66.4%	0.0%	4.4%	22.0%	0.0%	0.0%	0.0%	1.6%	100.0%
Shortleaf pine / oak	1.9%	0.0%	1.0%	2.1%	3.0%	82.7%	0.0%	6.0%	3.3%	100.0%
Chestnut oak / black oak / scarlet oak	0.0%	0.5%	0.7%	4.3%	17.0%	73.8%	0.0%	0.0%	3.7%	100.0%
Loblolly pine	30.8%	24.4%	0.0%	0.0%	2.8%	0.0%	0.0%	0.0%	42.0%	100.0%
Sassafras / persimmon	0.0%	4.2%	16.8%	35.1%	7.8%	33.6%	0.0%	0.0%	2.5%	100.0%
Sycamore / pecan / American elm	0.7%	16.0%	7.3%	12.0%	30.2%	15.7%	0.0%	2.3%	15.8%	100.0%
Other	8.4%	4.4%	7.6%	23.5%	25.4%	15.7%	1.7%	3.4%	10.0%	100.0%

Table 3. Forest composition of timberland within Bird Conservation Region 24 (acres; percent of column total in parentheses).

Forest Type	AL	AR	IL	IN	KY	MO	OH	OK	TN	TOTAL
White oak / red oak / hickory	231,547 (21.7)	2,550,128 (51.1)	413,678 (38.9)	917,617 (29.8)	2,509,443 (43.6)	5,007,702 (48.8)	2,564 (2.7)	510,999 (45.8)	2,051,601 (38.9)	14,195,279 (43.4)
Mixed upland hardwoods	190,022 (17.8)	302,709 (6.1)	60,579 (5.7)	226,533 (7.4)	241,390 (4.2)	405,820 (4.0)	30,765 (32.4)	0 (0.0)	1,041,931 (19.7)	2,499,749 (7.6)
Post oak / blackjack oak	17,687 (1.7)	583,431 (11.7)	11,936 (1.1)	0 (0.0)	59,539 (1.0)	1,251,797 (12.2)	0 (0.0)	251,713 (22.6)	47,521 (0.9)	2,223,624 (6.8)
White oak	37,894 (3.5)	120,518 (2.4)	36,946 (3.5)	152,777 (5.0)	63,601 (1.1)	1,162,551 (11.3)	0 (0.0)	0 (0.0)	197,213 (3.7)	1,771,500 (5.4)
Eastern redcedar / hardwood	20,985 (2.0)	315,060 (6.3)	9,284 (0.9)	72,122 (2.3)	477,927 (8.3)	467,394 (4.6)	0 (0.0)	0 (0.0)	369,796 (7.0)	1,732,568 (5.3)
Eastern redcedar	0 (0.0)	208,422 (4.2)	17,457 (1.6)	31,833 (1.0)	160,046 (2.8)	343,905 (3.4)	0 (0.0)	0 (0.0)	138,072 (2.6)	899,735 (2.8)
Sugarberry / hackberry / elm / green ash	78,852 (7.4)	30,554 (0.6)	89,413 (8.4)	55,780 (1.8)	259,903 (4.5)	108,832 (1.1)	0 (0.0)	5,932 (0.5)	149,113 (2.8)	778,379 (2.4)
Yellow-poplar / white oak / red oak	10,615 (1.0)	0 (0.0)	10,462 (1.0)	192,252 (6.2)	171,303 (3.0)	0 (0.0)	0 (0.0)	0 (0.0)	388,987 (7.4)	773,619 (2.4)
Sugar maple / beech / yellow birch	9,574 (0.9)	0 (0.0)	40,862 (3.8)	395,894 (12.9)	200,424 (3.5)	83,411 (0.8)	12,819 (13.5)	0 (0.0)	13,907 (0.3)	756,891 (2.3)
Sweetgum / yellow-poplar	68,092 (6.4)	11,684 (0.2)	44,389 (4.2)	70,137 (2.3)	194,679 (3.4)	2,372 (0.02)	0 0.00	200,214 (17.9)	0 0.00	591,567 (1.8)
Shortleaf pine	0 (0.0)	239,736 (4.8)	25,878 (2.4)	12,780 (0.4)	5,340 (0.09)	172,208 (1.7)	0 (0.0)	14,261 (1.3)	1,752 (0.03)	471,955 (1.4)
Chestnut oak	17,653 (1.7)	0 (0.0)	0 (0.0)	53,533 (1.7)	151,984 (2.6)	0 (0.0)	0 (0.0)	0 (0.0)	227,201 (4.3)	450,371 (1.4)
White pine / red oak / white ash	0 (0.0)	73,787 (1.5)	0 (0.0)	14,638 (0.5)	219,451 (3.8)	3,127 (0.03)	0 (0.0)	0 (0.0)	127,717 (2.4)	438,720 (1.3)
Virginia pine / southern red oak	23,884 (2.2)	281,847 (5.6)	0 (0.0)	18,492 (0.6)	93,127 (1.6)	0 (0.0)	0 (0.0)	0 (0.0)	6,805 (0.1)	424,155 (1.3)
Shortleaf pine / oak	8,075 (0.8)	0 (0.0)	4,185 (0.4)	8,663 (0.3)	12,642 (0.2)	347,047 (3.4)	0 (0.0)	25,247 (2.3)	13,686 (0.3)	419,545 (1.3)
Chestnut oak / black oak / scarlet oak	0 (0.0)	2,039 (0.04)	2,773 (0.3)	16,940 (0.6)	67,058 (1.2)	291,579 (2.8)	0 (0.0)	0 (0.0)	14,627 (0.3)	395,016 (1.2)
Loblolly pine	105,335 (9.9)	83,453 (1.7)	0 (0.0)	0 (0.0)	9,503 (0.2)	0 (0.0)	0 (0.0)	0 (0.0)	143,386 (2.7)	341,677 (1.0)
Sassafras / persimmon	0 (0.0)	13,300 (0.3)	53,445 (5.0)	112,003 (3.6)	24,921 (0.4)	106,966 (1.0)	0 (0.0)	0 (0.0)	8,088 (0.2)	318,723 (1.0)
Sycamore / pecan / American elm	2,136 (0.2)	46,171 (0.9)	21,203 (2.0)	34,755 (1.1)	87,453 (1.5)	45,399 (0.4)	0 (0.0)	6,688 (0.6)	45,602 (0.9)	289,407 (0.9)
Other	245,560 (23.0)	128,836 (2.6)	222,313 (20.9)	689,478 (22.4)	745,517 (13.0)	459,657 (4.5)	48,818 (51.4)	100,974 (9.0)	292,850 (5.5)	2,934,003 (9.0)

Table 4. Stand size class composition (in thousands of acres) of the most common forest types found in states within BCR 24.

	Forest Type																			
Stand size class	White oak / red oak / hickory	Mixed upland hardwoods	Post oak / blackjack oak	White oak	Eastern redcedar / hardwood	Eastern redcedar	Sugarberry / hackberry / elm / green ash	Yellow-poplar / white oak / red oak	Sugar maple / beech / yellow birch	Shortleaf pine / oak	Sweetgum / yellow-poplar	Shortleaf pine	Chestnut oak	White pine / red oak / white ash	Chestnut oak / black oak / scarlet oak	Loblolly pine	Sassafras / persimmon	Sycamore / pecan / American elm	Cherry / ash / yellow-poplar	River birch / sycamore	All Forest Types
Alabama																					
Large	173.8	18.8	4.2	21.3	0.0	0.0	16.7	2.2	9.6	0.0	16.7	0.0	17.7	0.0	0.0	44.2	0.0	2.1	0.0	7.2	448.2
Medium	55.1	110.0	2.7	16.6	21.0	0.0	12.4	8.5	0.0	0.0	39.1	0.0	0.0	0.0	0.0	11.1	0.0	0.0	0.0	11.9	358.1
Small	2.7	61.2	10.8	0.0	0.0	0.0	49.8	0.0	0.0	8.1	12.3	0.0	0.0	0.0	0.0	50.0	0.0	0.0	0.0	0.0	261.6
Arkansas																					
Large	1,437.0	134.0	190.2	40.8	32.2	26.5	15.0	0.0	0.0	143.8	1.9	181.0	0.0	14.4	0.0	46.6	0.0	17.4	0.0	10.5	2,330.9
Medium	1,014.1	100.2	358.6	79.8	230.2	124.7	15.6	0.0	0.0	115.8	3.5	55.0	0.0	46.0	0.0	21.7	0.0	23.7	0.0	11.4	2,243.7
Small	99.0	68.5	34.6	0.0	52.7	57.2	0.0	0.0	0.0	22.2	6.3	3.7	0.0	13.4	0.0	15.2	13.3	5.1	0.0	0.0	417.0
Illinois																					
Large	319.0	38.5	11.9	36.9	0.0	2.1	52.7	6.3	24.0	4.2	28.8	24.7	0.0	0.0	0.0	0.0	24.4	15.7	0.0	11.6	739.7
Medium	76.7	22.1	0.0	0.0	0.0	15.4	33.9	0.0	11.7	0.0	15.0	0.8	0.0	0.0	0.0	0.0	26.7	0.0	15.5	3.7	272.3
Small	18.0	0.0	0.0	0.0	9.3	0.0	2.8	4.2	5.1	0.0	0.6	0.4	0.0	0.0	2.8	0.0	2.3	5.5	0.0	0.0	50.9
Indiana																					
Large	803.5	105.3	0.0	142.8	29.8	12.2	35.1	150.7	363.1	8.7	54.2	12.8	53.5	14.6	16.9	0.0	66.4	17.4	95.3	41.5	2,325.1
Medium	89.6	93.0	0.0	10.0	26.1	11.9	12.0	22.8	14.6	0.0	7.9	0.0	0.0	0.0	0.0	0.0	24.4	10.6	38.5	31.4	500.6
Small	24.5	28.3	0.0	0.0	16.2	7.8	8.7	18.8	18.2	0.0	8.0	0.0	0.0	0.0	0.0	0.0	21.2	6.7	31.9	0.0	239.9
Kentucky																					
Large	1,755.0	129.6	44.6	50.7	124.4	30.2	166.5	122.9	154.9	6.9	94.7	3.2	105.1	61.9	43.5	5.9	5.0	60.7	49.1	22.7	3,421.1
Medium	652.2	83.3	1.0	12.9	198.0	68.4	81.7	35.0	33.3	5.7	84.7	2.1	37.3	128.3	23.5	3.6	6.4	22.4	4.4	32.7	1,700.7
Small	102.2	28.4	14.0	0.0	155.5	61.5	11.7	13.3	12.2	0.0	15.3	0.0	9.7	29.3	0.0	0.0	13.5	4.4	0.0	9.6	583.5
Missouri																					
Large	2,672.3	113.3	490.2	734.5	71.6	62.0	63.1	0.0	42.7	222.1	0.0	123.1	0.0	3.1	159.9	0.0	7.5	31.1	0.0	44.1	5,024.5
Medium	1,919.6	170.0	671.5	411.0	283.0	184.5	22.5	0.0	27.8	115.7	0.0	44.2	0.0	0.0	102.0	0.0	22.5	14.3	1.6	13.2	4,134.6
Small	415.8	122.5	90.1	17.1	112.8	97.4	23.3	0.0	12.9	9.2	2.4	4.9	0.0	0.0	29.7	0.0	77.0	0.0	0.8	5.9	1,059.1
Ohio																					
Large	0.0	20.5	0.0	0.0	0.0	0.0	0.0	0.0	10.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.0	0.0	66.8
Medium	2.6	7.7	0.0	0.0	0.0	0.0	0.0	0.0	2.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6	0.0	25.6
Small	0.0	2.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6
Oklahoma																					
Large	218.5	0.0	85.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.7	0.0	0.0	0.0	0.0	0.0	6.7	0.0	0.0	336.8
Medium	139.6	0.0	79.8	0.0	0.0	0.0	0.0	0.0	0.0	25.2	0.0	7.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	290.1
Small	152.9	0.0	86.3	0.0	0.0	0.0	5.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	289.0
Tennessee																					
Large	1,391.5	513.7	29.5	153.9	33.7	14.2	65.2	309.3	7.1	13.7	78.9	1.8	177.3	11.9	6.8	33.0	2.2	17.8	0.0	0.0	2,974.7
Medium	568.6	399.5	18.0	43.3	277.0	81.4	62.8	48.8	6.8	0.0	76.1	0.0	42.0	74.4	7.8	37.0	3.9	20.6	8.0	0.0	1,899.6

Small	91.5	128.7	0.0	0.0	59.0	42.5	21.1	30.9	0.0	0.0	45.2	0.0	7.9	41.4	0.0	73.4	2.0	7.2	0.0	0.0	597.2
Total BCR																					
Large	8,770.5	1,073.7	856.3	1,180.8	291.8	147.1	414.3	591.3	611.6	399.4	275.2	353.2	353.5	105.9	227.2	129.6	105.6	169.0	158.4	137.6	17,667.8
Medium	4,518.1	985.8	1,131.6	573.6	1,035.2	486.2	240.8	115.0	96.8	262.5	226.3	109.8	79.2	248.6	133.3	73.5	84.0	91.6	70.6	104.3	11,425.3
Small	906.6	440.2	235.8	17.1	405.5	266.4	123.3	67.3	48.4	39.5	90.1	9.0	17.6	84.1	32.4	138.6	129.1	28.9	32.7	15.6	3,500.7

Large diameter trees: hardwoods at least 11 inches diameter, 9 inches for softwoods; size class has more than 50% of stocking in medium and large diameter trees, with stocking of large trees equal to or greater than medium diameter trees. **Medium diameter** trees: trees at least 5 inches diameter but not as large as large diameter trees; size class has more than 50% of stocking in medium and large diameter trees, with stocking of large diameter trees less than stocking of medium diameter trees. **Small diameter** trees: trees less than 5 inches diameter; size class has at least 50% of the stocking in small diameter trees.

Table 5. Physiographic class composition (in thousands of acres) of the most common forest types found in states within BCR 24.

	Forest Type																			
Physio-graphic class	White oak / red oak / hickory	Mixed upland hardwoods	Post oak / blackjack oak	White oak	Eastern redcedar / hardwood	Eastern redcedar	Sugarberry / hackberry / elm / green ash	Yellow-poplar / white oak / red oak	Sugar maple / beech / yellow birch	Sweetgum / yellow-poplar	Shortleaf pine	Chestnut oak	White pine / red oak / white ash	Virginia pine / southern red oak	Shortleaf pine / oak	Chestnut oak / black oak / scarlet oak	Loblolly pine	Sassafras / persimmon	Sycamore / pecan / American elm	All forest types
Dry tops	660.1	41.5	322.9	90.7	0.0	65.4	0.0	2.1	0.0	0.0	40.3	49.7	9.4	5.7	96.5	68.0	0.0	12.1	0.0	1,586.6
Dry slopes	3,494.8	174.8	650.6	773.7	74.0	215.9	8.7	7.6	43.4	6.7	87.6	37.1	0.0	11.9	179.5	204.1	9.9	48.4	2.3	6,550.2
Deep sands	3.6	0.0	0.0	3.1	370.0	0.0	0.0	5.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.4
Other xeric	70.1	5.2	36.4	7.3	0.0	13.0	0.0	0.0	1.5	0.0	6.4	0.0	0.0	1.5	9.3	3.2	0.0	0.0	0.0	154.6
Flatwoods	472.7	118.5	106.0	26.0	0.0	48.4	50.1	33.1	62.0	117.9	39.0	0.0	24.6	8.6	30.7	2.8	25.3	66.9	40.4	1,884.1
Rolling uplands	8,117.0	1,937.0	841.1	801.0	194.8	537.5	248.9	564.3	478.3	377.3	260.9	332.9	381.8	102.1	318.8	97.2	301.9	155.6	45.0	18,311.1
Moist slopes and coves	596.5	105.6	1.8	37.4	1,017.2	1.3	13.7	105.5	116.8	26.1	13.3	24.0	4.3	8.0	33.6	18.3	0.0	11.3	7.4	1,287.6
Narrow floodplains/ bottomlands	108.8	62.1	13.1	20.8	42.9	6.7	212.6	5.2	15.0	55.8	4.2	0.0	3.1	0.0	3.7	0.0	2.4	11.0	93.1	1,000.8
Broad floodplains/ bottomlands	50.4	9.3	0.0	1.8	16.4	0.0	75.1	6.0	0.0	7.7	0.0	0.0	4.9	4.5	0.0	0.0	0.0	1.5	86.9	491.0
Other mesic	567.9	1.9	0.0	3.0	1.8	10.7	9.7	22.3	15.5	0.0	20.4	6.7	4.8	0.0	29.3	0.0	0.0	12.0	6.7	1,099.6
Swamps/bogs	0.0	0.0	0.0	0.0	0.0	0.0	9.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	36.1
Small drains	46.1	13.2	0.0	6.8	0.0	0.9	3.9	21.8	11.5	0.0	0.0	0.0	5.9	0.0	0.0	1.5	2.1	0.0	7.7	167.3

Bays and wet pocosins	0.0	0.0	0.0	0.0	13.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3
Beaver ponds	0.0	0.0	0.0	0.0	0.0	0.0	10.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.5
Other hydric	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.2

Table 6. Forest ownership categories in Bird Conservation Region 24 (acres; percent of column total in parentheses).

Ownership	Total	AL	AR	IL	IN	KY	MO	OH	OK	TN
National Forest	2,607,426 (7.8)	53,665 (5.0)	685,300 (13.7)	260,073 (24.4)	182,499 (5.9)	86,012 (1.5)	1,331,330 (13.0)	0 (0.0)	0 (0.0)	8,547 (0.2)
National Park Service	18,716 (<0.1))	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	18,716 (0.2)	0 (0.0)	0 (0.0)	0 (0.0)
U.S. Fish and Wildlife Service	109,607 (0.3)	41,839 (3.9)	0 (0.0)	23,685 (2.2)	29,728 (1.0)	8,912 (0.2)	5,444 (<0.1)	0 (0.0)	0 (0.0)	0 (0.0)
Dept of Defense	281,159 (0.9)	26,330 (2.5)	8,012 (0.2)	0 (0.0)	100,882 (3.3)	43,796 (0.8)	54,137 (0.5)	0 (0.0)	0 (0.0)	48,001 (0.9)
Other federal	536,078 (1.6)	41,587 (3.9)	74,322 (1.5)	0 (0.0)	45,036 (1.5)	107,846 (1.9)	106,085 (1.0)	0 (0.0)	24,484 (2.7)	136,717 (2.5)
State	1,031,167 (3.2)	38,451 (3.6)	99,479 (2.0)	38,991 (3.7)	177,115 (5.8)	78,658 (1.4)	457,742 (4.5)	0 (0.0)	33,447 (3.7)	107,284 (2.0)
County and Municipal	159,539 (0.5)	2,859 (0.3)	5,994 (0.1)	28,769 (2.7)	16,279 (0.5)	29,338 (0.5)	23,872 (0.2)	10,255 (10.8)	20,963 (2.3)	21,209 (0.4)
Private	27,962,788 (85.5)	863,180 (80.8)	4,118,569 (82.5)	713,286 (67.0)	2,524,688 (82.1)	5,400,686 (93.8)	8,262,438 (80.5)	84,710 (89.2)	836,920 (91.4)	5,158,313 (94.1)
All	32,706,482 (100.0)	1,067,911 (100.0)	4,991,676 (100.0)	1,064,804 (100.0)	3,076,226 (100.0)	5,755,250 (100.0)	10,259,766 (100.0)	94,965 (100.0)	915,814 (100.0)	5,480,071 (100.0)

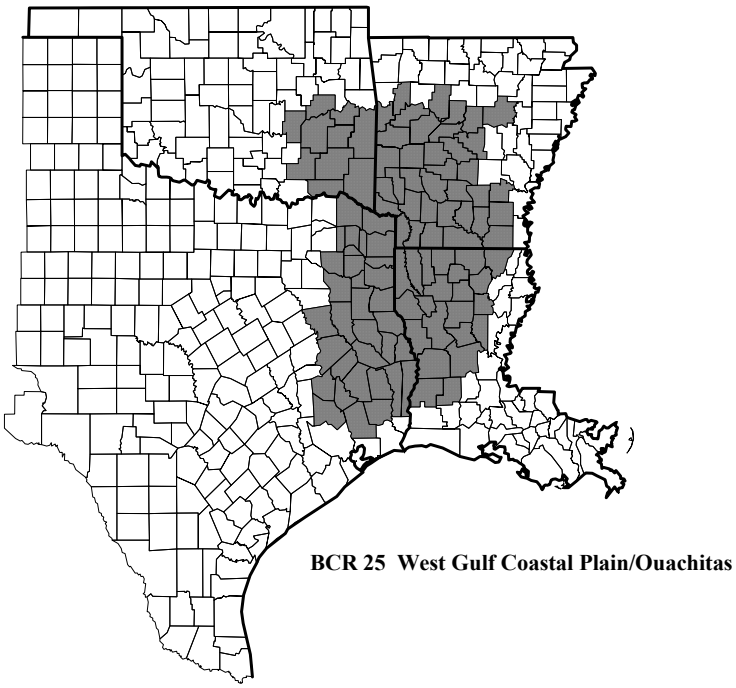
Table 7. Calculation of population deficits and habitat goals for American woodcock in Bird Conservation Region 24[1].			
	Historical[2]		Current
Total land area (acres)			
Illinois	4,048,314		4,048,314
Indiana	8,805,504		8,805,504
Ohio	264,179		264,179
Total	13,117,997		13,117,997
Manageable acres			
Illinois	2,454,200		1,064,802
Indiana	2,824,500		3,076,225
Ohio	927,600		94,965
Total	6,206,300		4,235,992
Population of singing males			
Illinois	3,697		6,971
Indiana	11,715		4,716
Ohio	443		211
Total	15,856		11,977
Population deficit (singing males)[3]			
Illinois		No deficit	
Indiana		8,043	
Ohio		No deficit	
Total		8,043	
Habitat goal (acres)[4]			
Illinois		No deficit	
Indiana		509,126	
Ohio		No deficit	
Total		509,126	

Bird Conservation Region 25: Ouachita / West Gulf Coastal Plain

Affected states: Arkansas, Louisiana, Oklahoma, Texas

Current area of forest land: 33,236,000 acres (5,852,571 acres of small diameter and non-stocked forest)

Woodcock trend estimate – not applicable Woodcock density estimate – not applicable



Physiography and Habitat Description

The portions of the BCR are contained in sections 232F (Coastal Plains and Flatwoods), 231E (Mid Coastal Plains, Western), and 231G (Arkansas Valley). Such areas are pine dominated with largely shortleaf pine in the north which includes the Ouachita Mountains, and longleaf pine in the south. Too, hardwood-dominated bottomlands along the Arkansas River and other drainages occur. Much of this land has been converted to pine plantation, pasture or other land uses.

Between the current and baseline forest inventories there has been a loss of nearly 362,000 ac (-2%) of timberland in this BCR (Table 1). Worse, there has been a net loss of over 4,152,000 ac (-42%) of small diameter and non-stocked forest during the same period. Major forest types include loblolly pine (38%), loblolly / hardwood (12%), white oak / red oak/ hickory (11%), shortleaf pine (6%), sweetgum / Nuttall oak/ willow oak (6%), and shortleaf pine / oak (6%; Tables 2 and 3). About 24% of the total timberland is comprised of small diameter trees (Table 4). Rolling uplands and flatwoods are the dominant physiographic classes on which major forest types within the region are found (Table 5). Some 87% of the 34.3 million acres of timberland in the region is under private ownership (Table 6). Federal lands comprise almost 10% of timberland while state or county forest ownership comprises another 2%.

Habitat Goals

The substantial decline in both small diameter and non-stocked classes of trees from historical distributions is a major concern. It seems that the loss in the small diameter class can be attributed to the concomitant increase in medium and especially large diameter tree classes. Of the medium and large diameter classes, for wintering woodcock, the shift to the large diameter class is preferable compared to a shift to the medium tree class. Most of the current forestland is in loblolly pine (~38%), and undoubtedly, much of that loblolly pine is under plantation management While loblolly pine is used by

wintering woodcock, other forest types with a greater component of hardwood would be preferable, e.g. loblolly pine / hardwood, sweetgum / Nuttall oak / willow oak.

Among the many possible ways to alter loblolly pine stands to include a greater hardwood component, the primary mechanism will be an increase in the need for hardwood products and the ability to substitute hardwood fiber into previously pine-only products. Both of these mechanisms revolve around the notion that (1) some hardwoods are more suited for stands where pines are grown off-site or only with the aid of moderate to intensive management, and (2) changing technologies have allowed the substitution of hardwood fiber in previously pine-only products. With profit margins shrinking, the luxury of planting pines on sites that are better suited for hardwoods will no longer be appropriate. Too, the increased demand for cheaper hardwood fiber will increase the need for hardwood management on marginal pinelands. Thus, the need for large scale Federal or state programs to subsidize a shift in pine production may not be as necessary in this BCR as elsewhere. During the hopeful shift from pine dominated stands to pine / hardwood stands, Federal and state land managers should be encouraged to manage for a larger component of hardwood stands of small diameter and non-stocked classes.

Without sufficient wintering habitat, any increases in woodcock production on the breeding grounds will be for naught as the limiting population factor will shift to insufficient wintering habitat.

Table 1. Current and historic (ca. 1970-76) stand-size distribution of forestland in Bird Conservation Region (BCR) 25 and portions of individual states within the BCR.

	Current stand-size distribution (acres)						Historic stand-size distribution (acres)				
Area	Total forestland[1]	Large diameter[2,3]	Medium diameter[2,4]	Small diameter[2,5]	Non-stocked[2,6]		Total forestland[1]	Large diameter[2,3]	Medium diameter[2,4]	Small diameter[2,5]	Non-stocked[2,6]
Arkansas	11,250,900	5,999,212.0	3,291,919.0	1,959,777.0	12,300		11,173,500	3,882,700	3,015,200	4,235,100	40,500
	(33.9)	(37.1)	(35.7)	(33.8)	(26.6)		(33.3)	(26.4)	(34.0)	(43.2)	(19.6)
Louisiana	8,330,800	3,993,805.0	2,046,868.0	229,015.0	15,900		8,722,000	4,368,600	2,258,100	1,947,200	148,100
	(25.1)	(24.7)	(22.2)	(3.9)	(34.3)		(26.0)	(29.7)	(25.4)	(19.9)	(71.6)
Oklahoma	3,467,800	974,026	1,523,839	969,927	0		3,185,900	885,300	1,103,100	1,191,700	6,000
	(10.4)	(6.0)	(16.5)	(16.7)	(0.0)		(9.5)	(6.0)	(12.4)	(12.2)	(2.9)
Texas	10,186,500	5,179,429.0	2,359,493.0	2,647,552.0	18,100		10,517,400	5,580,500	2,500,600	2,424,000	12,100
	(30.6)	(32.1)	(25.6)	(45.6)	(39.0)		(31.3)	(37.9)	(28.2)	(24.7)	(5.9)
Total BCR	33,236,000	16,146,472	9,222,119	5,806,271	46,300		33,598,800	14,717,100	8,877,000	9,798,000	206,700
	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)		(100.0)	(100.0)	(100.0)	(100.0)	(100.0)

[1] Percentages in parentheses. Percentages for total forestland refer to percent of column total.
[2] Percentages for various diameter categories and non-stocked category refer to percent of total forestland for current and historic time periods within each state.
[3] Softwoods at least 9 inches, and hardwoods at least 11 inches in diameter at breast height.
[4] Trees at least 5 inches in diameter at breast height, but smaller than large diameter.
[5] Saplings 1-5 inches diameter at breast height, plus softwood seedlings more than 6 inches tall and hardwood seedlings more than 12 inches tall.
[6] Commercial forest land on which stocking of trees is less than 16.7 percent.

Table 2. Percent composition of forest types between states within BCR 25.

Forest Type	AR	LA	OK	TX	Total
Loblolly pine	30.8%	29.3%	3.6%	36.2%	100.0%
Loblolly pine / hardwood	28.1%	28.9%	2.0%	41.0%	100.0%
White oak / red oak / hickory	44.5%	18.9%	21.5%	15.1%	100.0%
Shortleaf pine	48.1%	5.1%	26.8%	20.0%	100.0%
Sweetgum / Nuttall oak / willow oak	42.7%	30.3%	2.1%	24.8%	100.0%
Shortleaf pine / oak	48.6%	1.3%	26.5%	23.7%	100.0%
Post oak / blackjack oak	26.4%	0.0%	34.1%	39.5%	100.0%
Slash pine	0.0%	77.9%	0.0%	22.1%	100.0%
Sugarberry / hackberry / elm / green ash	26.6%	17.6%	16.1%	39.7%	100.0%
Overcup oak / water hickory	14.1%	41.6%	1.7%	42.5%	100.0%
Mixed upland hardwoods	44.3%	37.2%	1.4%	17.1%	100.0%
Swamp chestnut oak / cherrybark oak	30.0%	22.2%	0.0%	47.7%	100.0%
Sweetgum / yellow-poplar	45.0%	40.1%	0.0%	14.9%	100.0%
Baldcypress / water tupelo	23.8%	51.3%	0.0%	24.9%	100.0%
Eastern redcedar / hardwood	65.6%	0.0%	24.7%	9.7%	100.0%
Longleaf pine	0.0%	80.8%	0.0%	19.2%	100.0%
Non stocked	20.4%	18.3%	0.0%	61.3%	100.0%
Sweetbay / swamp tupelo / red maple	8.2%	37.4%	0.0%	54.3%	100.0%
Oak / Gum / Cypress Group	0.0%	0.0%	100.0%	0.0%	100.0%
Other	32.5%	18.3%	25.2%	24.1%	100.0%

Table 3. Forest composition of timberland within Bird Conservation Region 25 (acres; percent of column total in parentheses).

Forest Type	AR	LA	OK	TX	Total
Loblolly pine	3,976,489 (34.2)	3,781,497 (44.2)	464,743 (13.1)	4,673,619 (44.4)	12,896,348 (37.7)
Loblolly pine / hardwood	1,167,031 (10.0)	1,198,501 (14.0)	83,600 (2.4)	1,701,720 (16.2)	4,150,852 (12.1)
White oak / red oak / hickory	1,734,692 (14.9)	735,257 (8.6)	836,525 (23.5)	588,032 (5.6)	3,894,506 (11.4)
Shortleaf pine	1,048,039 (9.0)	110,246 (1.3)	583,175 (16.4)	435,768 (4.1)	2,177,228 (6.4)
Sweetgum / Nuttall oak / willow oak	917,059 (79)	651,277 (7.6)	46,139 (1.3)	532,921 (5.1)	2,147,396 (6.3)
Shortleaf pine / oak	983,557 (8.5)	25,929 (0.3)	536,598 (15.1)	479,688 (4.6)	2,025,772 (5.9)
Post oak / blackjack oak	290,394 (2.5)	0 (0.0)	374,626 (10.5)	434,152 (4.1)	1,099,172 (3.2)
Slash pine	0 (0.0)	562,874 (6.6)	0 (0.0)	159,938 (1.5)	722,812 (2.1)
Sugarberry / hackberry / elm / green ash	174,157 (1.5)	115,097 (1.3)	105,314 (3.0)	259,248 (2.5)	653,816 (1.9)
Overcup oak / water hickory	91,077 (0.8)	268,105 (3.1)	11,122 (0.3)	273,932 (2.6)	644,236 (1.9)
Mixed upland hardwoods	283,068 (2.4)	237,853 (2.8)	9,260 (0.3)	109,460 (1.0)	639,641 (1.9)
Swamp chestnut oak / cherrybark oak	152,351 (1.3)	112,608 (1.3)	0 (0.0)	242,115 (2.3)	507,074 (1.5)
Sweetgum / yellow-poplar	140,844 (1.2)	125,316 (1.5)	0 (0.0)	46,593 (0.4)	312,753 (0.9)
Baldcypress / water tupelo	68,067 (0.6)	146,904 (1.7)	0 (0.0)	71,133 (0.7)	286,104 (0.8)
Eastern redcedar / hardwood	175,220 (1.5)	0 (0.0)	65,999 (1.9)	26,006 (0.2)	267,225 (0.8)
Longleaf pine	0 (0.0)	181,669 (2.1)	0 (0.0)	43,074 (0.4)	224,743 (0.7)
Non stocked	32,233 (0.3)	29,054 (0.3)	0 (0.0)	97,095 (0.9)	158,382 (0.5)
Sweetbay / swamp tupelo / red maple	12,453 (0.1)	56,545 (0.7)	0 (0.0)	82,059 (0.8)	151,057 (0.4)
Oak / Gum / Cypress Group	0 (0.0)	0 (0.0)	150,588 (4.2)	0 (0.0)	150,588 (0.4)
Other	370,645 (3.2)	208,351 (2.4)	287,140 (8.1)	274,515 (2.6)	1,140,651 (3.3)

Table 4. Stand size class[1] composition (in thousands of acres) of the most common forest types found in states within BCR 25.

	Forest Type																				
Stand size class	Loblolly pine	Loblolly pine / hardwood	White oak / red oak / hickory	Shortleaf pine	Sweetgum / Nuttall oak / willow oak	Shortleaf pine / oak	Post oak / blackjack oak	Slash pine	Sugarberry / hackberry / elm / green ash	Overcup oak / water hickory	Mixed upland hardwoods	Swamp chestnut oak / cherrybark oak	Sweetgum / yellow-poplar	Baldcypress / water tupelo	Eastern redcedar / hardwood	Longleaf pine	Sweetbay / swamp tupelo / red maple	Oak / Gum / Cypress Group	Oak / Hickory Group	Sycamore / pecan / American elm	All forest types
Arkansas																					
Large	1,773.4	663.9	970.5	804.5	523.6	645.9	78.1	0.0	112.5	49.5	108.4	114.8	39.2	51.6	25.0	0.0	8.9	0.0	0.0	29.5	5,999.2
Medium	1,145.9	300.8	571.0	176.4	251.8	305.2	189.0	0.0	29.4	35.4	114.9	13.9	41.5	13.0	94.3	0.0	3.6	0.0	0.0	5.8	3,291.9
Small	1,057.2	202.3	193.2	67.2	141.7	32.5	23.3	0.0	32.2	6.1	59.7	23.6	60.1	3.5	56.0	0.0	0.0	0.0	0.0	1.2	1,959.8
Louisiana																					
Large	1,413.8	682.4	437.9	110.2	375.1	7.3	0.0	252.2	59.8	161.8	66.6	93.7	30.9	109.6	0.0	152.6	31.1	0.0	0.0	8.7	3,993.8
Medium	1,117.6	218.4	121.1	0.0	144.1	10.9	0.0	183.9	19.4	65.7	72.4	15.3	16.6	35.2	0.0	13.2	13.1	0.0	0.0	0.0	2,046.9
Small	1,250.0	297.7	176.2	0.0	132.1	7.7	0.0	126.8	35.9	40.6	98.8	3.6	77.9	2.1	0.0	15.8	12.4	0.0	0.0	12.5	2,290.2
Oklahoma																					
Large	67.8	3.8	155.5	298.6	28.5	177.5	93.1	0.0	37.1	0.0	9.3	0.0	0.0	0.0	5.5	0.0	0.0	77.8	0.0	19.4	974.0
Medium	315.5	11.6	370.4	195.4	11.5	239.8	207.7	0.0	45.0	5.6	0.0	0.0	0.0	0.0	17.6	0.0	0.0	30.7	54.5	18.4	1,523.8
Small	81.5	68.1	310.6	89.2	6.1	119.3	73.8	0.0	23.2	5.6	0.0	0.0	0.0	0.0	42.9	0.0	0.0	42.1	90.4	17.4	969.9
Texas																					
Large	2,053.7	857.9	265.6	364.9	303.1	261.0	218.5	103.5	120.4	195.5	46.2	197.7	9.2	58.6	16.8	36.9	49.7	0.0	0.0	20.4	5,179.4
Medium	1,257.2	344.1	146.1	40.7	101.1	112.4	124.4	47.4	63.4	36.7	16.1	13.3	27.5	12.6	6.6	0.0	9.0	0.0	0.0	1.0	2,359.5
Small	1,362.8	499.7	176.4	30.2	128.7	106.4	91.3	9.1	75.5	41.7	47.1	31.1	9.9	0.0	2.6	6.2	23.4	0.0	0.0	5.6	2,647.6
Total BCR																					
Large	5,308.7	2,208.0	1,829.5	1,578.2	1,230.3	1,091.7	389.7	355.7	329.8	406.9	230.6	406.2	79.3	219.7	47.2	189.5	89.6	77.8	0.0	78.0	16,146.5
Medium	3,836.2	874.9	1,208.6	412.5	508.6	668.3	521.1	231.2	157.2	143.4	203.4	42.5	85.5	60.7	118.5	13.2	25.7	30.7	54.5	25.3	9,222.1
Small	3,751.4	1,067.9	856.4	186.5	408.6	265.8	188.4	135.9	166.9	93.9	205.7	58.4	147.9	5.7	101.5	22.0	35.7	42.1	90.4	36.6	7,867.4

Large diameter trees: hardwoods at least 11 inches diameter, 9 inches for softwoods; size class has more than 50% of stocking in medium and large diameter trees, with stocking of large trees equal to or greater than medium diameter trees. **Medium diameter** trees: trees at least 5 inches diameter but not as large as large diameter trees; size class has more than 50% of stocking in medium and large diameter trees, with stocking of large diameter trees less than stocking of medium diameter trees. **Small diameter** trees: trees less than 5 inches diameter; size class has at least 50% of the stocking in small diameter trees.

Table 5. Physiographic class composition (in thousands of acres) of the most common forest types found in states within BCR 25.

Physio-graphic class	Loblolly pine	Loblolly pine / hardwood	White oak / red oak / hickory	Shortleaf pine	Sweetgum / Nuttall oak / willow oak	Shortleaf pine / oak	Post oak / blackjack oak	Slash pine	Sugarberry / hackberry / elm / green ash	Overcup oak / water hickory	Mixed upland hardwoods	Swamp chestnut oak / cherrybark oak	Sweetgum / yellow-poplar	Baldcypress / water tupelo	Eastern redcedar / hardwood	Longleaf pine	Non stocked	Sweetbay / swamp tupelo / red maple	Oak / Gum / Cypress Group	Other
	Forest Type																			
Bays and wet pocosins	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	0.0	12.6
Beaver ponds	0.0	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.9	0.0	0.0	0.0	0.0	9.4	0.0	0.0	23.9
Broad floodplains/ bottomlands	31.0	49.7	6.5	0.0	295.0	0.0	6.3	0.0	181.5	264.0	7.3	41.9	14.5	51.7	7.1	0.0	14.1	11.6	0.0	1,057.3
Cypress ponds	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	0.0	0.0	0.0	0.0	0.0	6.3
Deep sands	6.6	0.0	7.1	0.0	6.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.0	0.0	0.0	0.0	51.7
Dry slopes	0.0	0.0	50.8	18.3	0.0	54.2	27.6	0.0	0.0	0.0	0.0	4.4	0.0	0.0	10.2	0.0	0.0	0.0	0.0	187.8
Dry tops	0.0	3.1	25.6	32.2	0.0	37.6	8.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	129.7
Flatwoods	1,920.8	1,429.2	537.6	73.5	1,065.2	50.8	74.8	434.7	176.0	180.8	206.4	193.3	92.6	21.2	59.2	55.1	40.9	41.9	0.0	8,858.0
Moist slopes and coves	11.3	9.4	21.1	2.2	20.1	20.7	10.2	0.0	0.0	0.0	0.0	8.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	119.7
Narrow floodplains/ bottomlands	56.2	131.1	127.9	0.0	395.8	6.1	6.3	0.0	120.5	154.8	48.6	187.8	25.6	62.3	0.0	0.0	12.2	31.5	0.0	1,466.7
Other hydric	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22.6	0.0	0.0	0.0	0.0	0.0	46.8
Other mesic	458.6	78.0	836.7	566.5	55.7	531.0	374.6	0.0	105.3	11.1	18.5	0.0	0.0	0.0	66.0	0.0	0.0	0.0	150.6	3,528.5
Other xeric	28.4	17.6	5.6	16.7	9.6	5.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.9	0.0	0.0	0.0	0.0	0.0	93.9
Rolling uplands	6,406.9	2,406.3	2,275.8	1,467.9	252.7	1,318.1	591.1	285.4	62.6	2.1	358.7	53.1	173.5	2.3	124.8	157.6	73.7	23.7	0.0	18,338.6
Small drains	0.0	9.4	0.0	0.0	29.0	1.7	0.0	2.7	0.0	0.0	0.0	11.7	5.0	0.2	0.0	0.0	0.0	17.6	0.0	88.5
Swamps/ bogs	0.0	15.0	0.0	0.0	17.7	0.0	0.0	0.0	7.9	22.2	0.0	0.0	1.5	118.6	0.0	0.0	8.2	23.0	0.0	240.4

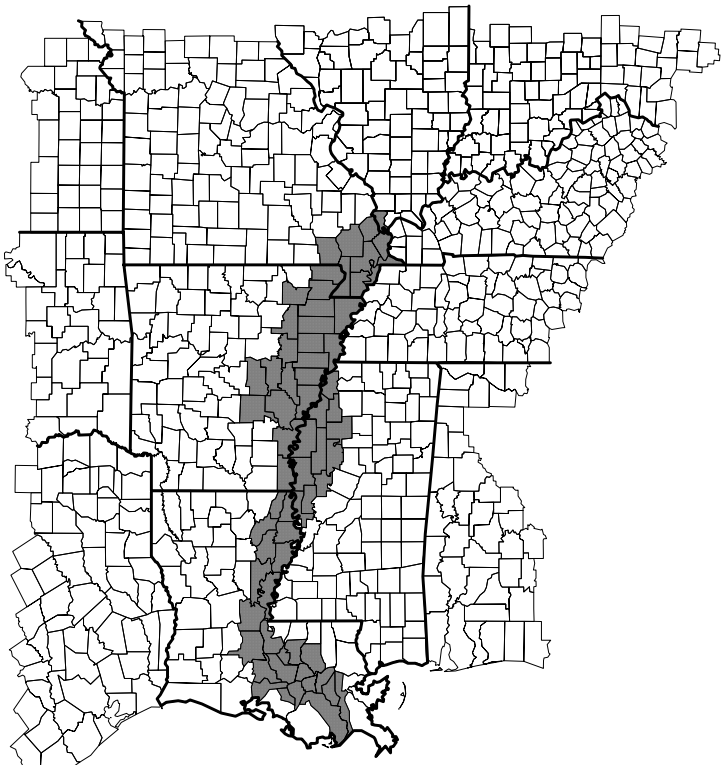
Table 6. Forest ownership categories in Bird Conservation Region 25 (acres; percent of column total in parentheses).					
Ownership	Total	AR	LA	OK	TX
National Forest	3,254.3 (9.5)	1,684.3 (14.5)	661.6 (7.7)	222.7 (6.3)	685.7 (6.5)
U.S. Fish and Wildlife Service	49.8 (0.1)	38.9 (0.3)	10.9 (0.1)	0.0 (0.0)	0.0 (0.0)
Dept. of Defense	167.4 (0.5)	55.1 (0.5)	10.6 (0.1)	0.0 (0.0)	101.7 (1.0)
Other federal	383.4 (1.1)	166.8 (1.4)	71.1 (0.8)	143.8 (4.0)	1.7 (<0.1)
State	473.1 (1.4)	120.1 (1.0)	185.5 (2.2)	77.8 (2.2)	89.7 (0.9)
County and Municipal	189.7 (0.6)	46.0 (0.4)	136.0 (1.6)	0.0 (0.0)	7.7 (<0.1)
Other Local Government	10.9 (<0.1)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	10.9 (0.1)
Private	29,721.7 (86.8)	9,506.2 (81.8)	7,471.3 (87.4)	3,110.6 (87.5)	9,633.5 (91.5)
Total	34,250.4 (100.0)	11,617.4 (100.0)	8,547.1 (100.0)	3,554.8 (100.0)	10,531.1 (100.0)

Bird Conservation Region 26: Mississippi Alluvial Valley

Affected states: Arkansas, Illinois, Kentucky, Louisiana, Mississippi, Missouri, Tennessee

Current area of forest land: 5,218,978 acres (655,381 acres of small diameter and non-stocked forest)

Woodcock trend estimate – not applicable Woodcock density estimate – not applicable



BCR 26 Mississippi Alluvial Valley

Physiography and Habitat Description

The portions of the BCR are contained in section 234A (Mississippi Alluvial Basin). This area is classified as southern floodplain forest and oak-hickory forest. The predominant vegetation form is cold-deciduous, alluvial broadleaf forest, with small areas of cool-deciduous, broad-leaved forest on upland sites. About 90% of the area is agricultural, cleared of natural vegetation and drained by a system of ditches. Because of these ditches, periodic flooding, which was a principal historical disturbance, has been reduced, eliminated, or significantly altered in timing.

Between the current and baseline forest inventories there has been a decrease of nearly 520 thousand acres (-10%) of forestland in this BCR (Table 1). There has also been a net loss 493 thousand acres (-43%) of small diameter/non-stocked forest during the same period. Major forest types include sugarberry / hackberry / elm / green ash (19%), sweetgum / Nuttall oak / willow oak (17%), baldcypress / water tupelo (14%), white oak / red oak / hickory (9%), overcup oak / water hickory (7%), and loblolly pine (6%; Tables 2 and 3). Around 12% of total timberland in the region is comprised of small diameter trees (Table 4). Flatwoods and broad floodplains / bottomlands are the dominanat physiographic classes on which major forest types within the region are found (Table 5). Around 82% of the 5.9 million acres of timberland in the region is under private ownership (Table 6). Federal land comprises 7% while state and county forest comprises about 10% of all timberland.

BCR 26 was once an important migration and wintering area for woodcock. The conversion of the forestlands there has had an unknown impact on woodcock migration, and has undoubtedly had a negative impact on the amount of wintering habitat.

Habitat Goals

The substantial loss of small diameter and non-stocked tree classes from historical to current times is a major concern. The Mississippi Alluvial Valley was at one time thought of as an important migration corridor and to a lesser extent a wintering site – especially the southern portion. While the habitat use by migrating woodcock has been little researched, it is evident that wintering woodcock need access to early successional habitats at some time during the winter. This need must be met. Clearly early successional habitats are not being managed for, but instead medium and large diameter tree classes are being managed for. These younger habitats are important for wintering woodcock and need to be managed for in such a way that they are available through time and on a readily available basis. Woodcock will not fly far (~<2 km) to reach early successional habitat types on a daily basis. Although Federal properties only amount to <10% of available timberlands, these properties must continue to manage for these early successional stands because commercial private timberlands make money on older stands, not younger stands. Unfortunately, the current management philosophy on most Federal lands in this BCR is to convert all open lands into closed canopy bottomland forests. This myopic view is short-sighted and needs to be reevaluated. Too, on all private lands, the movement away from clear cutting as a tool for managing bottomland hardwoods has contributed to the current forest age class and spatial pattern. The reduction in clear cutting has undoubtedly suffered because of the public's misunderstanding of the use of clear cutting. Possibly public education will allow a greater acceptance of clear cutting. Another approach to increasing early successional habitats on private lands will be to target non-corporate timberland owners to appreciate the need and use of early successional habitats by wildlife. Many wildlife species including the woodcock heavily use and depend on early successional timber stands.

Table 1. Current and historic (ca. 1970-76) stand-size distribution of forestland in Bird Conservation Region (BCR) 26 and portions of individual states within the BCR.

	Current stand-size distribution (acres)						Historic stand-size distribution (acres)				
Area	Total forestland[1]	Large diameter[2,3]	Medium diameter[2,4]	Small diameter[2,5]	Non-stocked[2,6]		Total forestland[1]	Large diameter[2,3]	Medium diameter[2,4]	Small diameter[2,5]	Non-stocked[2,6]
Arkansas	1,949,604	1,175,699	560,367	211,528	2,010		1,832,800	887,900	425,400	511,100	8,400
	(37.4)	(35.6)	(44.4)	(33.3)	(10.2)		(31.9)	(27.1)	(32.5)	(49.0)	(8.0)
Illinois	48,629	29,208	15,762	3,660	0		108,600	58,110	28,350	19,680	2,460
	(0.9)	(0.9)	(1.2)	(0.6)	(0.0)		(1.9)	(1.8)	(2.2)	(1.9)	(2.4)
Kentucky	24,639	19,821	4,818	0	0		11,902	5,284	2,852	3,751	15
	(0.5)	(0.6)	(0.4)	(0.0)	(0.0)		(0.2)	(0.2)	(0.2)	(0.4)	(<0.1)
Louisiana	2,927,468	1,928,467	592,038	390,163	16,800		3,476,300	2,187,800	746,300	462,800	79,400
	(56.1)	(58.4)	(46.9)	(61.4)	(85.6)		(60.6)	(66.7)	(57.0)	(44.3)	(75.9)
Missouri	264,095	146,608	89,674	26,989	824		292,500	124,900	107,100	46,200	14,300
	(5.1)	(4.4)	(7.1)	(4.2)	(4.2)		(5.1)	(3.8)	(8.2)	(4.4)	(13.7)
Tennessee	4,543	1,136	0	3,407	0		16,000	16,000	0	0	0
	(<0.1)	(<0.1)	(0.0)	(0.5)	(0.0)		(0.3)	(0.5)	(0.0)	(0.0)	(0.0)
Total BCR	5,218,978	3,300,939	1,262,659	635,747	19,634		5,738,102	3,279,994	1,310,002	1,043,531	104,575
	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)		(100.0)	(100.0)	(100.0)	(100.0)	(100.0)

[1] Percentages in parentheses. Percentages for total forestland refer to percent of column total.
[2] Percentages for various diameter categories and non-stocked category refer to percent of total forestland for current and historic time periods within each state.
[3] Softwoods at least 9 inches, and hardwoods at least 11 inches in diameter at breast height.
[4] Trees at least 5 inches in diameter at breast height, but smaller than large diameter.
[5] Saplings 1-5 inches diameter at breast height, plus softwood seedlings more than 6 inches tall and hardwood seedlings more than 12 inches tall.
[6] Commercial forest land on which stocking of trees is less than 16.7 percent.

Table 2. Percent composition of forest types between states within BCR 26.								
Forest Type	AR	IL	KY	LA	MS	MO	TN	Total
Sugarberry / hackberry / elm / green ash	32.3%	0.0%	0.8%	41.6%	22.9%	2.4%	0.0%	100.0%
Sweetgum / Nuttall oak / willow oak	25.7%	0.0%	0.0%	56.3%	17.3%	0.7%	0.0%	100.0%
Baldcypress / water tupelo	19.4%	0.0%	0.6%	72.7%	6.8%	0.4%	0.1%	100.0%
White oak / red oak / hickory	67.7%	3.8%	0.0%	4.6%	8.1%	15.8%	0.0%	100.0%
Overcup oak / water hickory	37.5%	0.0%	0.0%	44.5%	16.5%	1.6%	0.0%	100.0%
Loblolly pine	36.5%	0.0%	0.0%	59.9%	3.7%	0.0%	0.0%	100.0%
Willow	24.4%	3.8%	0.0%	57.0%	7.6%	5.9%	1.3%	100.0%
Sycamore / pecan / American elm	23.6%	0.0%	2.2%	64.1%	6.9%	3.2%	0.0%	100.0%
Loblolly pine / hardwood	15.5%	0.0%	0.0%	76.4%	8.1%	0.0%	0.0%	100.0%
Mixed upland hardwoods	37.6%	0.0%	0.9%	52.7%	0.0%	8.8%	0.0%	100.0%
Swamp chestnut oak / cherrybark oak	29.3%	0.0%	0.0%	65.1%	4.7%	0.9%	0.0%	100.0%
Cottonwood	44.6%	0.0%	4.8%	42.5%	8.0%	0.0%	0.0%	100.0%
Sweetgum / yellow-poplar	37.2%	0.0%	0.0%	51.6%	0.0%	11.2%	0.0%	100.0%
Oak / Gum / Cypress Group	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	100.0%
Cottonwood / willow	22.8%	0.0%	0.0%	77.2%	0.0%	0.0%	0.0%	100.0%
Yellow-poplar / white oak / red oak	92.6%	7.4%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
Sweetbay / swamp tupelo / red maple	38.5%	5.7%	0.0%	49.4%	0.0%	6.4%	0.0%	100.0%
Red maple / lowland	31.7%	0.0%	0.0%	64.8%	0.0%	3.5%	0.0%	100.0%
Sassafras / persimmon	52.1%	18.5%	0.0%	25.7%	0.0%	3.8%	0.0%	100.0%
Other	30.5%	1.3%	0.0%	38.3%	0.0%	29.8%	0.0%	100.0%

Table 3. Forest composition of timberland within Bird Conservation Region 26 (acres; percent of column total in parentheses).								
Forest Type	AR	IL	KY	LA	MS	MO	TN	Total
Sugarberry / hackberry / elm / green ash	366,165 (18.8)	0 (0.0)	8,981 (36.4)	471,498 (16.0)	258,921 (34.8)	26,724 (10.1)	0 (0.0)	1,132,289 (18.9)
Sweetgum / Nuttall oak / willow oak	262,602 (13.5)	0 (0.0)	0 (0.0)	575,422 (19.6)	176,906 (23.8)	6,719 (2.5)	0 (0.0)	1,021,649 (17.1)
Baldcypress / water tupelo	167,190 (8.6)	0 (0.0)	4,818 (19.6)	624,951 (21.3)	58,201 (7.8)	3,746 (1.4)	1,136 (25.0)	860,042 (14.4)
White oak / red oak / hickory	370,826 (19.0)	20,924 (43.0)	0 (0.0)	25,026 (0.9)	44,352 (6.0)	86,373 (32.7)	0 (0.0)	547,501 (9.2)
Overcup oak / water hickory	166,107 (8.5)	0 (0.0)	0 (0.0)	196,821 (6.7)	72,930 (9.8)	6,893 (2.6)	0 (0.0)	442,751 (7.4)
Loblolly pine	125,128 (6.4)	0 (0.0)	0 (0.0)	205,428 (7.0)	12,672 (1.7)	0 (0.0)	0 (0.0)	343,228 (5.7)
Willow	62,431 (3.2)	9,712 (20.0)	0 (0.0)	146,135 (5.0)	19,438 (2.6)	15,174 (5.7)	3,407 (75.0)	256,297 (4.3)
Sycamore / pecan / American elm	50,748 (2.6)	0 (0.0)	4,818 (19.6)	138,162 (4.7)	14,825 (2.0)	6,929 (2.6)	0 (0.0)	215,482 (3.6)
Loblolly pine / hardwood	24,088 (1.2)	0 (0.0)	0 (0.0)	119,038 (4.0)	12,672 (1.7)	0 (0.0)	0 (0.0)	155,798 (2.6)
Mixed upland hardwoods	51,106 (2.6)	0 (0.0)	1,205 (4.9)	71,501 (2.4)	0 (0.0)	11,929 (4.5)	0 (0.0)	135,741 (2.3)
Swamp chestnut oak / cherrybark oak	31,004 (1.6)	0 (0.0)	0 (0.0)	68,915 (2.3)	4,989 (0.7)	939 (0.4)	0 (0.0)	105,847 (1.8)
Cottonwood	44,364 (2.3)	0 (0.0)	4,818 (19.6)	42,275 (1.4)	7,974 (1.1)	0 (0.0)	0 (0.0)	99,431 (1.7)
Sweetgum / yellow-poplar	26,641 (1.4)	0 (0.0)	0 (0.0)	36,875 (1.3)	0 (0.0)	8,016 (3.0)	0 (0.0)	71,532 (1.2)
Oak / Gum / Cypress Group	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	60,130 (8.1)	0 (0.0)	0 (0.0)	60,130 (1.0)
Cottonwood / willow	13,123 (0.7)	0 (0.0)	0 (0.0)	44,436 (1.5)	0 (0.0)	0 (0.0)	0 (0.0)	57,559 (1.0)
Yellow-poplar / white oak / red oak	45,892 (2.4)	3,660 (7.5)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	49,552 (0.8)
Sweetbay / swamp tupelo / red maple	18,641 (1.0)	2,757 (5.7)	0 (0.0)	23,923 (0.8)	0 (0.0)	3,074 (1.2)	0 (0.0)	48,395 (0.8)
Red maple / lowland	14,926 (0.8)	0 (0.0)	0 (0.0)	30,538 (1.0)	0 (0.0)	1,649 (0.6)	0 (0.0)	47,113 (0.8)
Sassafras / persimmon	22,308 (1.1)	7,917 (16.3)	0 (0.0)	11,003 (0.4)	0 (0.0)	1,611 (0.6)	0 (0.0)	42,839 (0.7)
Other	86,315 (4.4)	3,660 (7.5)	0 (0.0)	108,332 (3.7)	0 (0.0)	84,321 (31.9)	0 (0.0)	282,628 (4.7)

Table 4. Stand size class[1] composition (in thousands of acres) of the most common forest types found in states within BCR 26.

	Forest type																		
Stand size class	Sugarberry / hackberry / elm / green ash	Sweetgum / Nuttall oak / willow oak	Baldcypress / water tupelo	White oak / red oak / hickory	Overcup oak / water hickory	Loblolly pine	Willow	Sycamore / pecan / American elm	Loblolly pine / hardwood	Mixed upland hardwoods	Swamp chestnut oak / cherrybark oak	Cottonwood	Sweetgum / yellow-poplar	Oak / Gum / Cypress Group	Cottonwood / willow	Yellow-poplar / white oak / red oak	Sweetbay / swamp tupelo / red maple	Red maple / lowland	All Forest Types
Arkansas																			
Large	261,996	197,461	109,326	221,867	120,647	40,183	33,592	50,748	14,068	8,038	29,140	27,883	0	0	8,039	22,830	0	0	1,175,699
Medium	65,954	45,813	51,860	138,992	34,009	54,509	20,791	0	0	23,521	1,864	16,481	9,082	0	5,084	23,062	15,827	6,338	560,367
Small	38,215	19,328	6,004	9,966	11,451	30,436	8,048	0	10,019	19,547	0	0	17,560	0	0	0	2,814	8,588	211,528
Illinois																			
Large	0	0	0	16,739	0	0	1,795	0	0	0	0	0	0	0	0	0	2,757	0	29,208
Medium	0	0	0	4,185	0	0	7,917	0	0	0	0	0	0	0	0	0	0	0	15,762
Small	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3,660	0	0	3,660
Kentucky																			
Large	4,163	0	4,818	0	0	0	0	4,818	0	1,205	0	4,818	0	0	0	0	0	0	19,821
Medium	4,818	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4,818
Small	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Louisiana																			
Large	308,938	386,762	554,267	25,026	153,106	37,185	36,394	121,104	77,378	13,108	45,428	15,811	30,691	0	41,345	0	12,466	14,087	1,928,467
Medium	136,341	117,682	64,551	0	33,126	44,704	79,180	14,839	12,263	11,457	16,716	17,193	0	0	0	0	11,457	16,451	592,038
Small	26,219	70,979	6,132	0	10,589	123,539	30,561	2,218	29,397	46,936	6,771	9,272	6,184	0	3,091	0	0	0	390,163
Mississippi																			
Large	236,738	170,431	58,201	25,344	46,673	0	12,963	14,825	6,336	0	4,989	7,974	0	34,353	0	0	0	0	618,827
Medium	14,209	0	0	12,672	21,067	0	0	0	0	0	0	0	0	9,798	0	0	0	0	57,746
Small	7,974	6,475	0	6,336	5,190	12,672	6,475	0	6,336	0	0	0	0	15,979	0	0	0	0	80,248
Missouri																			
Large	8,655	0	3,746	43,761	6,893	0	11,260	6,929	0	4,528	939	0	2,507	0	0	0	3,074	0	146,608
Medium	18,068	6,719	0	35,873	0	0	3,746	0	0	0	0	0	2,691	0	0	0	0	1,649	89,674
Small	0	0	0	6,738	0	0	168	0	0	7,401	0	0	2,818	0	0	0	0	0	26,989
Tennessee																			
Large	0	0	1,136	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,136
Medium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small	0	0	0	0	0	0	3,407	0	0	0	0	0	0	0	0	0	0	0	3,407
Total BCR																			
Large	820,490	754,654	731,494	332,737	327,319	77,368	96,004	198,424	97,782	26,879	80,496	56,486	33,198	34,353	49,384	22,830	18,297	14,087	3,919,766
Medium	239,390	170,214	116,411	191,722	88,202	99,213	111,634	14,839	12,263	34,978	18,580	33,674	11,773	9,798	5,084	23,062	27,284	24,438	1,320,405
Small	72,408	96,782	12,136	23,040	27,230	166,647	48,659	2,218	45,752	73,884	6,771	9,272	26,562	15,979	3,091	3,660	2,814	8,588	715,995

Large diameter trees: hardwoods at least 11 inches diameter, 9 inches for softwoods; size class has more than 50% of stocking in medium and large diameter trees, with stocking of large trees equal to or greater than medium diameter trees. **Medium diameter** trees: trees at least 5 inches diameter but not as large as large diameter trees; size class has more than 50% of stocking in medium and large diameter trees, with stocking of large diameter trees less than stocking of medium diameter trees. **Small diameter** trees: trees less than 5 inches diameter; size class has at least 50% of the stocking in small diameter trees.

Table 5. Physiographic class composition (in thousands of acres) of the most common forest types found in states within BCR 26.

Physio-graphic class	Sugarberry / hackberry / elm / green ash	Sweetgum / Nuttall oak / willow oak	Baldcypress / water tupelo	White oak / red oak / hickory	Overcup oak / water hickory	Loblolly pine	Willow	Sycamore / pecan / American elm	Loblolly pine / hardwood	Mixed upland hardwoods	Swamp chestnut oak / cherrybark oak	Cottonwood	Sweetgum / yellow-poplar	Oak / Gum / Cypress Group	Cottonwood / willow	Yellow-poplar / white oak / red oak	Sweetbay / swamp tupelo / red maple	Red maple / lowland	Sassafras / persimmon	Other	All forest types
	Forest Type																				
Dry tops	0.0	0.0	0.0	10.9	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.6
Dry slopes	0.0	0.0	0.0	24.9	0.0	0.0	0.0	0.0	12.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	80.6
Other xeric	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.7
Flatwoods	402.8	515.0	52.9	158.3	151.1	215.8	31.5	55.4	96.8	74.9	70.1	37.8	28.4	0.0	3.1	0.0	9.3	34.1	21.3	0.0	2,125.4
Rolling uplands	0.0	6.3	0.0	258.5	9.2	114.8	2.3	0.0	34.1	52.9	9.0	0.0	22.7	0.0	0.0	28.8	0.0	0.0	12.0	0.0	630.0
Moist slopes and coves	0.0	15.1	0.0	30.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.4	0.0	0.0	0.8	0.0	72.5
Narrow floodplains/ bottomlands	22.7	69.1	9.6	0.0	62.3	0.0	12.1	21.0	0.0	4.0	10.2	0.0	11.2	0.0	0.0	0.0	2.8	1.6	0.8	0.0	297.9
Broad floodplains/ bottomlands	81.8	239.2	222.1	10.3	140.6	0.0	106.7	111.5	0.0	0.9	0.0	46.2	9.3	0.0	54.5	0.0	6.3	5.0	0.0	6.0	1,278.9
Other mesic	244.3	5.0	15.9	47.6	68.0	12.7	11.5	14.8	12.7	2.9	5.0	15.4	0.0	60.1	0.0	0.0	0.0	0.0	0.0	0.0	703.8
Swamps/bogs	0.0	0.0	461.3	0.0	0.0	0.0	68.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.5	0.0	0.0	0.0	557.4
Deep sands	0.0	0.0	0.0	6.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.4	0.0	0.0	0.0	0.0	18.5
Bays and wet pocosins	0.0	0.0	0.0	0.0	0.0	0.0	3.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.1
Beaver ponds	0.0	0.0	0.0	0.0	0.0	0.0	7.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.9
Other hydric	14.6	0.0	65.6	0.0	5.0	0.0	8.0	12.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	112.0
Small drains	0.0	0.0	32.7	0.0	6.7	0.0	5.2	0.0	0.0	0.0	10.7	0.0	0.0	0.0	0.0	0.0	0.0	6.3	0.0	0.0	61.5

Table 6. Forest ownership categories in Bird Conservation Region 26 (acres; percent of column total in parentheses).								
Ownership	Total	AR	IL	KY	LA	MS	MO	TN
National Forest	185,705 (3.1)	34,167 (1.7)	20,924 (43.0)	0 (0.0)	22,148 (0.8)	58,695 (7.8)	49,771 (18.8)	0 (0.0)
National Park Service	3,074 (<0.1)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	3,074 (1.2)	0 (0.0)
U.S. Fish and Wildlife Service	103,637 (1.7)	94,102 (4.8)	0 (0.0)	0 (0.0)	2,769 (0.1)	0 (0.0)	6,765 (2.6)	0 (0.0)
Other federal	162,454 (2.7)	75,089 (3.9)	0 (0.0)	0 (0.0)	65,973 (2.3)	19,743 (2.6)	1,649 (0.6)	0 (0.0)
State	491,428 (8.2)	193,566 (9.9)	9,712 (20.0)	0 (0.0)	232,568 (7.9)	32,881 (4.3)	22,701 (8.6)	0 (0.0)
County and Municipal	137,248 (2.3)	9,400 (0.5)	0 (0.0)	0 (0.0)	98,152 (3.4)	17,063 (2.3)	12,632 (4.8)	0 (0.0)
Private	4,892,254 (81.9)	1,543,280 (79.2)	17,994 (37.0)	24,639 (100.0)	2,505,855 (85.6)	628,439 (83.0)	167,504 (63.4)	4,543 (100.0)
All	5,975,799 (100.0)	1,949,605 (100.0)	48,629 (100.0)	24,639 (100.0)	2,927,466 (100.0)	756,821 (100.0)	264,096 (100.0)	4,543 (100.0)

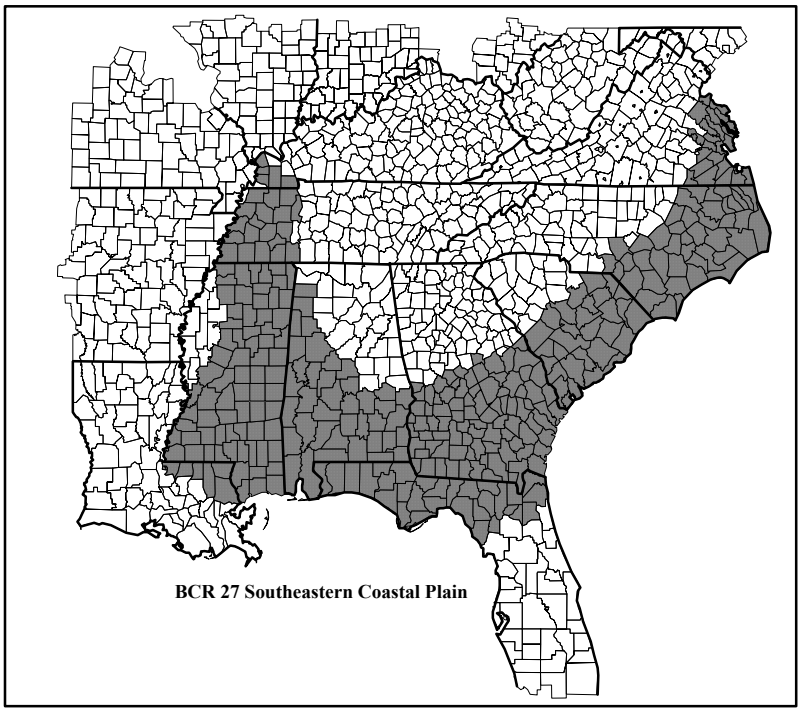
Bird Conservation Region 27: Southeastern Coastal Plain

Affected states: Kentucky, Tennessee, Mississippi, Louisiana, Alabama, Florida, Georgia, South Carolina, North Carolina, Virginia

Current area of forest land: 79,924,752 acres (33,418,693 acres of small diameter and non-stocked forest)

Woodcock trend estimate (% change/year)	1966-2004: -1.62 1994-2004: +3.30	Woodcock density estimate (singing males/mi^2)	1970: 0.66 2004: 0.18

*Trend and density estimates pertain only to Virginia portion of BCR



Physical Description of BCR 27

BCR 27 occupies the coastal plain regions of Virginia, North Carolina, South Carolina and Georgia, Panhandle portion and northern counties of peninsular Florida, southern Alabama, that region of Mississippi east of the Mississippi Alluvial Valley, southwestern Kentucky, western Tennessee and extreme southeast Louisiana. Woodcock are believed to be year-around residents throughout most of the BCR 27 and non-breeding residents on the southern fringes (Keppie and Whiting 1994).

BCR 27 includes the Southeastern Plains and the Mid-Atlantic and Southern Coastal Plain EPA Level III Ecoregions (http://www.epa.gov/wed/pages/ecoregions/level_iii.htm). The Southeastern Plains are a mosaic of cropland, pasture, woodland, and forest. Natural vegetation is mostly oak-hickory-pine and Southern mixed forest that lay inland of the coastal plain. Elevations and relief are greater than in the Southern Coastal Plain, but generally less than in much of the Piedmont. Streams in this area are relatively low-gradient and sandy-bottomed. The Southern Coastal Plain extends from South Carolina and Georgia through much of central Florida, and along the Gulf coast lowlands of the Florida Panhandle, Alabama, and Mississippi. Most of the ecoregion is flat coastal plain, but also contains barrier islands, coastal lagoons, marshes, and swampy lowlands along the Gulf and Atlantic coasts. This ecoregion is generally lower in elevation with less relief and wetter soils than the Southeastern Plains. Once covered by a variety of forest communities that included trees of longleaf pine, slash pine, pond pine, beech, sweetgum, southern magnolia, white oak, and laurel oak, land cover in the region is now mostly slash and loblolly pine with oak-gum-cypress forest in some low lying areas, citrus groves, pasture for beef cattle, and urban. In BCR 27, the Mid-Atlantic Coastal Plain extends from eastern North Carolina to eastern Virginia. The region is generally flat with deep, moist soils. Land cover is primarily forest, followed by agriculture, open habitats and wetlands. Forest cover is mostly loblolly pine and hardwood.

Forest Composition

Primary forest types in the BCR include loblolly pine, slash pine and loblolly pine/hardwood (Table 1) and 56% of the forest composition is pine or mixed pine/hardwood. Twenty-two percent, or 17 million acres, is classified as lowland hardwood types.

Trends in Woodcock Forested Habitats

Comparisons of Forest Inventory Analysis (FIA) data between 1970 and 2005 illustrate the change in the availability of early successional (seedling/sapling) habitats available to woodcock. Seedling/sapling habitats, expressed as a percentage of the forested landscape, have increased from 34.3% to 40.8% occurrence in the BCR, a 19% increase (Table 2). Seedling/sapling habitat in the BCR has increased from 26.8 million acres in the 1970s to 32.5 million acres in 2005. The largest increases in seedling/sapling acreage occurred in those portions of the BCR in Alabama and North Carolina (Figure 2). Mississippi witnessed a decrease in seedling/sapling acreage, but the total is still high compared to other BCR 27 states (Figure 2). Non-stocked forestlands, which may represent certain seasonally important types of woodcock habitat, have declined from 3.6% occurrence to 1.1% occurrence (Table 2). Florida has lost the largest acreage of non-stocked habitat, and has been replaced by Georgia has the state with the highest non-stocked habitats (Figure 3). In the 30 years between the surveys, BCR 27 has lost 2 million acres of non-stocked

habitats, gained 5.7 million acres of seedling/sapling habitat, and gained 1.5 million acres of forested habitats (Table 2).

Non-stocked (non-forested) habitat is used by woodcock for roosting and singing grounds. Between the 1970s and 2005, BCR 27 lost 2 million acres of non-stocked habitat, approximately a 70% decline. Largest losses occurred in portions of the BCR in FL (Figure 3).

Trends in Woodcock Wetland Habitats

Comparisons of National Wetland Inventory data illustrate the change in the availability of shrub/scrub (alder) and forested wetlands, both critical components of woodcock habitat. Forested wetlands have declined in the BCR from 15 million acres in 1950 to 12 million acres in 1990 (Koenig FWS, personal communication) (Figure 4). Shrub/scrub (alder) wetland acreage in the BCR has declined from 3.3 million acres in 1950 to 3.0 million acres in 1990 (Koenig FWS, personal communication) (Figure 4), although the 1990 acreages are higher than 1970 or 1980 figures.

Ownership Patterns of Woodcock Habitat in BCR 27

The majority (91%) of woodcock habitat in BCR 27 occurs on privately owned forestland (Table 3). US Forest Service National Forest acreage is high in Florida and Mississippi (7.3% and 5.9% respectively) but less than 3% of the BCR. State owned forestlands account for 2.3% of the BCR.

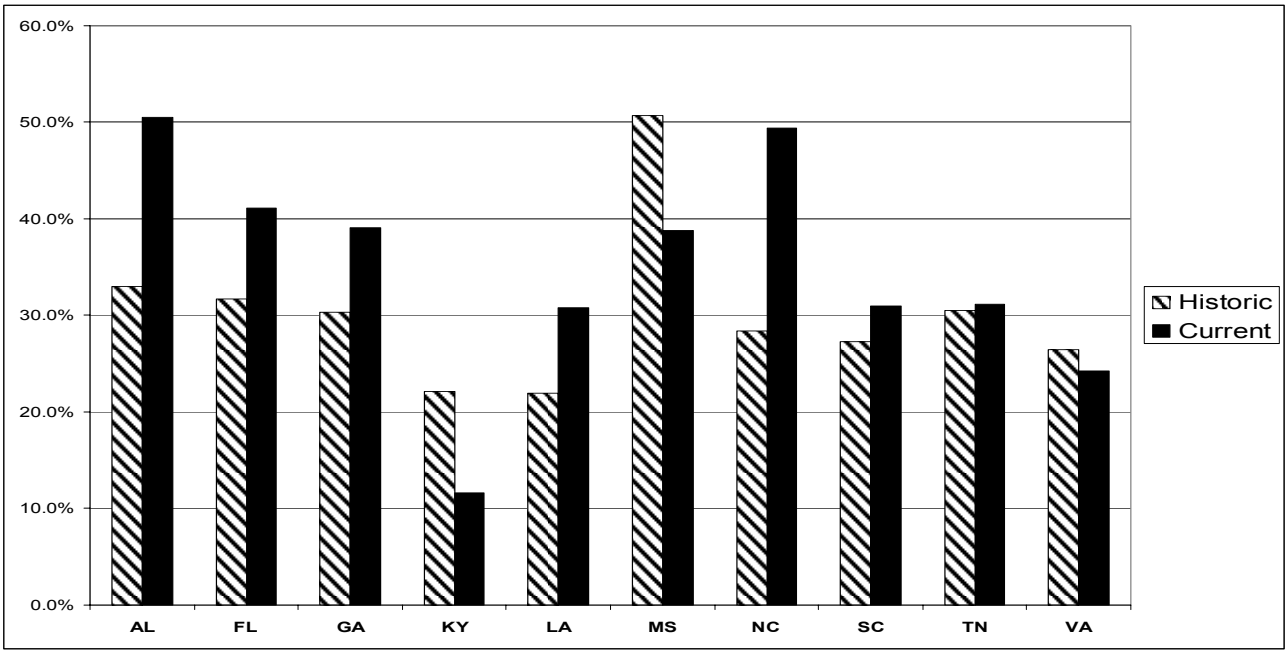


Figure 1. Percent of forested landscapes characterized as seedling/sapling size class in the 1970s and in 2005 for portions of states comprising BCR 27.

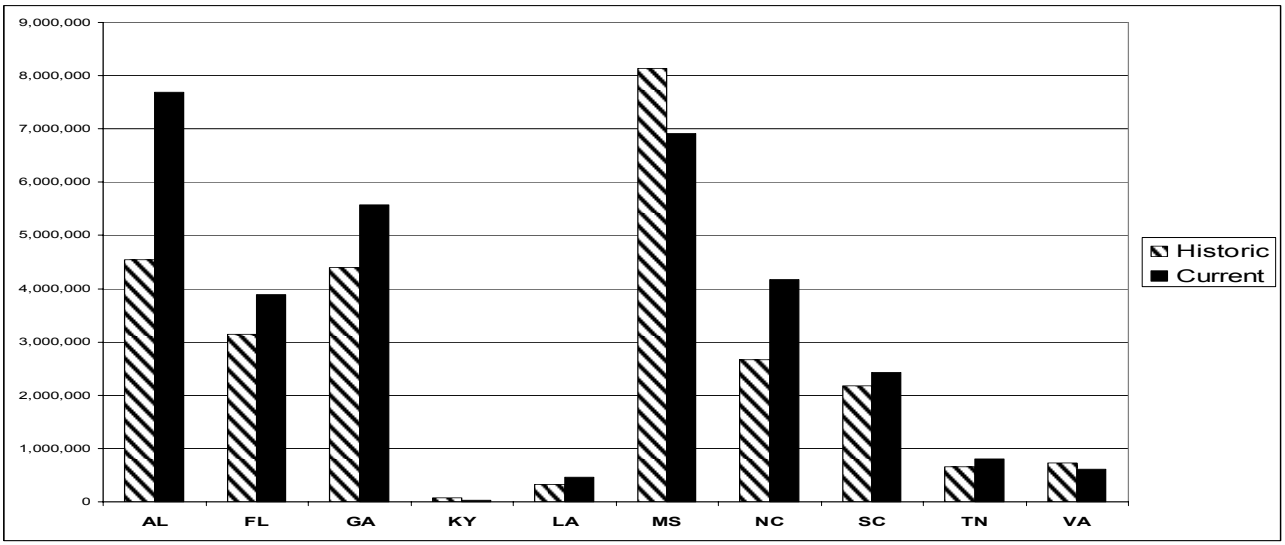


Figure 2. Acreage of seedling/sapling habitats in the 1970s and in 2005 for portions of states comprising BCR 27.

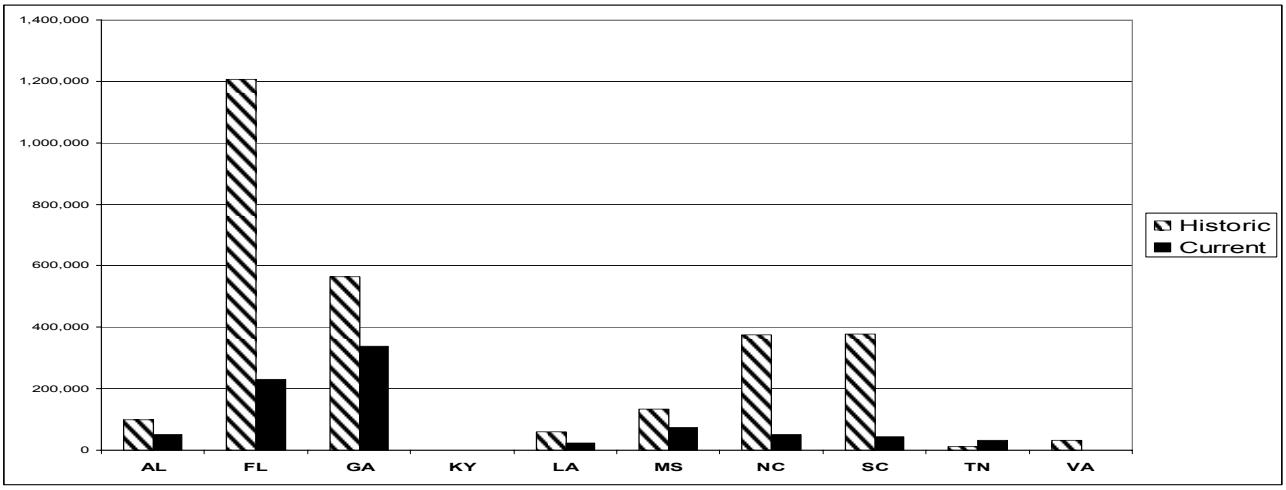


Figure 3. Acreage characterized as non-stocked (non-forested) habitat in the 1970s and in 2005 for portions of states comprising BCR 30.

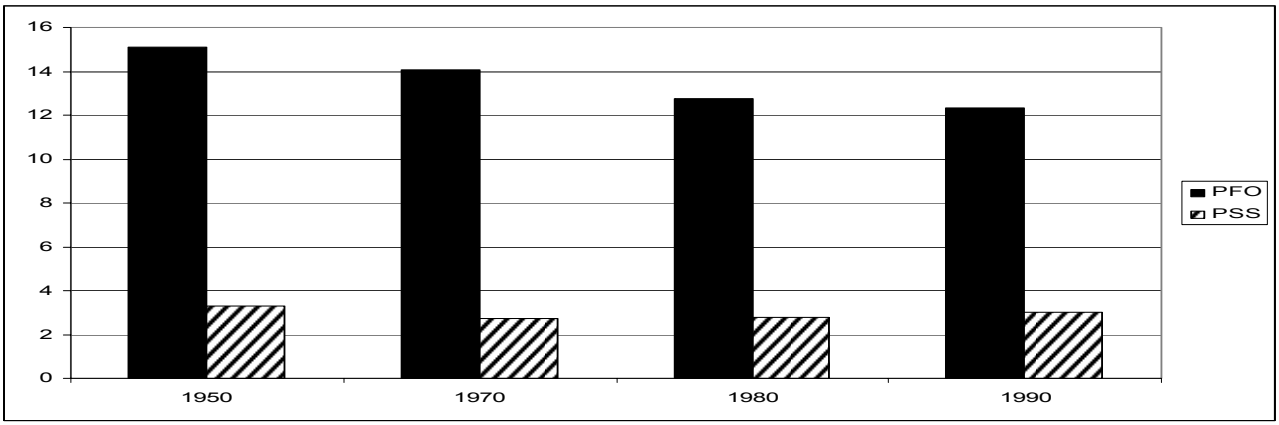


Figure 4. Acreage of forested wetlands (PFO) and shrub/scrub wetlands (PSS) (in millions of acres) in BCR 27.

Table 1. Dominant (>0.5%) forest type composition by state in BCR 27

BCR 27	KY	TN	MS	LA	AL	FL	GA	SC	NC	VA	Total
Loblolly pine	0	150,937	4,447,880	616,438	4,582,364	665,864	3,569,057	3,293,975	2,633,103	929,059	20,888,677
Slash pine	0	0	610,280	50,319	497,104	3,717,976	3,070,278	126,723	60,234	0	8,132,914
Loblolly pine / hardwood	0	99,191	2,280,286	185,315	1,952,756	231,759	1,036,629	564,283	1,267,748	345,342	7,963,309
Mixed upland hardwoods	9,260	527,596	176,227	80,483	2,928,368	744,991	964,853	337,973	806,930	182,717	6,759,397
White oak / red oak / hickory	117,724	529,816	4,376,554	94,493	254,191	5,385	239,245	80,980	82,297	255,960	6,036,646
Sweetgum / Nuttall oak / willow oak	0	217,430	931,608	91,177	1,007,724	433,309	1,134,213	1,097,048	453,857	86,297	5,452,662
Sweetbay / swamp tupelo / red maple	0	18,139	305,568	73,588	769,800	997,720	1,522,084	466,768	1,022,345	112,495	5,288,507
Sweetgum / yellow-poplar	14,879	247,356	193,535	56,552	636,809	62,134	345,268	254,466	653,130	238,046	2,702,173
Longleaf pine	0	0	255,502	25,051	483,969	516,114	351,510	408,870	177,448	0	2,218,464
Baldcypress / water tupelo	24,754	46,053	74,900	47,396	191,043	472,862	446,150	390,039	243,862	41,760	1,978,819
Slash pine / hardwood	0	0	287,653	11,127	200,508	366,739	566,957	24,999	12,980	0	1,470,962
Sugarberry / hackberry / elm / green ash	11,513	103,442	340,377	35,344	297,769	88,064	101,506	135,021	103,529	31,083	1,247,648
Oak / Gum / Cypress Group	0	0	1,188,138	0	0	0	0	0	0	0	1,188,138
Longleaf pine / oak	0	0	159,583	0	170,202	252,722	174,714	126,852	114,698	0	998,771
Oak / Hickory Group	0	0	943,529	0	0	0	0	0	0	0	943,529
Southern scrub oak	0	0	0	0	40,408	291,066	224,990	112,752	107,359	0	776,574
Shortleaf pine / oak	0	65,719	371,862	0	250,456	15,901	51,079	5,226	4,056	353	764,652
Shortleaf pine	0	43,138	370,532	0	205,554	16,908	76,255	3,711	8,181	2,826	727,105
Other pine / hardwood	0	7,780	28,877	29,925	90,998	71,994	87,197	22,874	199,307	0	538,952
Pond pine	0	0	0	0	0	52,942	46,779	115,818	306,568	0	522,106
Sand pine	0	0	0	0	0	336,428	27,354	0	0	0	363,782

Table 2. Area of timberland (acres) by stand-size class in Bird Conservation Region (BCR) 27 and portions of individual states within the BCR for current and historic (ca. 1970-75) time periods (Miles 2004).

	Current stand-size distribution in acres						Historic stand-size distribution in acres				
Area	Total forestland[1]	Large diameter[2,3]	Medium diameter[2,4]	Small diameter[2,5]	Non-stocked[2,6]		Total forestland[1]	Large diameter[2,3]	Medium diameter[2,4]	Small diameter[2,5]	Non-stocked[2,6]
Kentucky[7]	248,959	155,586	64,388	28,985	0		360,650	219,500	61,500	79,650	0
	(0.3)	(62.5)	(25.9)	(11.6)	(0.0)		(100.0)	(60.9)	(17.1)	(22.1)	(0.0)
Tennessee	2,569,826	1,200,483	536,924	799,984	32,434		2,146,300	647,200	833,200	654,600	11,300
	(3.2)	(46.7)	(20.9)	(31.1)	(1.3)		(100.0)	(30.2)	(38.8)	(30.5)	(0.5)
Mississippi	17,830,585	7,127,311	3,715,201	6,915,223	72,850		16,040,400	4,222,600	3,546,600	8,137,100	133,900
	(22.3)	(40.0)	(20.8)	(38.8)	(0.4)		(100.0)	(26.3)	(22.1)	(50.7)	(0.8)
Louisiana	1,517,196	702,703	324,895	467,345	22,252		1,507,700	876,500	241,300	330,200	59,700
	(1.9)	(46.3)	(21.4)	(30.8)	(1.5)		(100.0)	(58.1)	(16.0)	(21,9)	(4.0)
Alabama	15,207,691	4,370,156	3,103,117	7,682,620	51,799		13,798,600	4,907,000	4,244,100	4,549,600	97,900
	(19.0)	(28.7)	(20.4)	(50.5)	(0.3)		(100.0)	(35.6)	(30.8)	(33.0)	(0.7)
Florida	9,470,322	2,681,622	2,663,511	3,894,577	230,612		9,937,200	2,984,000	2,596,700	3,149,000	1,207,500
	(11.8)	(28.3)	(28.1)	(41.1)	(2.4)		(100.0)	(30.0)	(26.1)	(31.7)	(12.2)
Georgia	14,256,511	4,802,943	3,543,113	5,572,533	337,921		14,520,000	4,948,900	4,610,400	4,396,500	564,200
	(17.8)	(33.7)	(24.9)	(39.1)	(2.4)		(100.0)	(34.1)	(31.8)	(30.3)	(3.9)
South Carolina	7,850,877	2,724,356	2,651,715	2,431,075	43,732		7,956,800	3,617,400	1,793,300	2,169,300	376,800
	(9.8)	(34.7)	(33.8)	(31.0)	(0.6)		(100.0)	(45.5)	(22.5)	(27.3)	(4.7)
North Carolina	8,439,647	2,611,914	1,606,143	4,171,620	49,971		9,201,358	3,871,590	2,475,096	2,667,629	375,053
	(10.6)	(30.9)	(19.0)	(49.4)	(0.6)		(100.0)	(42.1)	(26.9)	(29.0)	(4.1)
Virginia	2,533,138	998,639	921,339	613,161	0		2,750,784	1,190,877	800,129	726,623	33,064
	(3.2)	(39.4)	(36.4)	(24.2)	(0.0)		(100.0)	(43.3)	(29.1)	(26.4)	(1.2)
Total BCR	79,924,752	27,375,713	19,130,346	32,577,122	841,571		78,219,792	27,485,567	21,202,525	26,860,202	2,859,417
	(100.0)	(34.3)	(23.9)	(40.8)	(1.1)		(100.0)	(35.1)	(27.1)	(34.3)	(3.7)

Woodcock Harvest and Population Status

Importance of BCR to Woodcock Populations

BCR 27 provides value to regional woodcock populations as migration and wintering habitats. Breeding and nesting occur in the BCR, but at low occurrence compared to other BCRs. Woodcock migrate through BCR 30, including through significant funnel-point stop-over habitats near Cape Charles, VA. Woodcock also concentrate during migration linearly along the Mississippi River.

BCR 27's highest value to woodcock is as winter range. Woodcock winter throughout the BCR from northeastern Virginia to Louisiana. Straw et al. (1994) identified three high areas of BCR 27 with high wintering woodcock populations: southeastern Louisiana, the coastal plain of South Carolina, and eastern VA. Straw et al. (1994) also identified medium density wintering ranges in Mississippi, southwestern and southeastern Alabama, western Georgia and coastal North Carolina.

Status of American Woodcock in Other Planning Efforts and Assessments

The measured decline of American Woodcock has prompted various planning and assessment efforts to highlight the importance of conservation actions dedicated to the improvement of woodcock habitat quality and quantity.

Woodcock are listed on state Wildlife Action Plan Species of Greatest Conservation Need lists in Virginia (tier 4), North Carolina (high priority), South Carolina (moderate priority), Alabama (priority 2), Mississippi (tier 3), and Louisiana.

The Partners in Flight Bird Conservation Plan for the South Atlantic Coastal Plain (Physiographic Area 03) (Hunter et al. 2001) covers the approximate area covered by the Atlantic coast extension of BCR 27. American Woodcock are listed as a high priority species representing the early successional habitat type although mention is also made of their use of forested wetlands. The Partners in Flight Bird Conservation Plan for the East Gulf Coastal Plain (Physiographic Area 04) (American Bird Conservancy 2001) covers the approximate area covered by the Gulf coast extension of BCR 27. Again, American Woodcock are listed as a high priority species representing the shrub-scrub, old field and early successional habitat types.

Table 3. Composition of forest ownership in Bird Conservation Region 27 (acres; percent of column total in parentheses).

Ownership	Total BCR	KY	TN	MS	LA	AL	FL	GA	SC	NC	VA
National Forest	2,362,224 (3.0)	0 (0.0)	0 (0.0)	1,047,929 (5.9)	0 (0.0)	247,438 (1.6)	694,592 (7.3)	4,131 (<0.1)	247,029 (3.1)	121,105 (1.4)	0 (0.0)
U.S. Fish and Wildlife Service	15,041 (<0.1)	9,682 (3.9)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	5,359 (0.1)	0 (0.0)	0 (0.0)
Other Federal	2,587,846 (3.2)	0 (0.0)	89,807 (3.5)	414,831 (2.3)	33,378 (2.2)	121,476 (0.8)	510,601 (5.4)	510,117 (3.6)	298,925 (3.8)	521,668 (6.2)	87,042 (3.6)
State	1,891,357 (2.4)	7,968 (3.2)	103,679 (4.0)	277,320 (1.6)	59,086 (3.9)	140,686 (0.9)	594,622 (6.3)	178,880 (1.3)	203,715 (2.6)	309,939 (3.7)	15,463 (0.6)
County & Municipal	345,395 (0.4)	0 (0.0)	22,084 (0.9)	82,477 (0.5)	0 (0.0)	62,393 (0.4)	20,393 (0.2)	36,590 (0.3)	28,582 (0.4)	57,914 (0.7)	34,962 (1.4)
Private	72,631,968 (91.0)	231,309 (92.9)	2,354,255 (91.6)	16,008,02 8 (89.8)	1,424,732 (93.9)	14,635,698 (96.2)	7,650,114 (80.8)	13,526,793 (94.9)	7,067,267 (90.0)	7,429,022 (88.0)	2,304,751 (94.4)
All ownerships	79,833,831 (100.0)	248,959 (100.0)	2,569,826 (100.0)	17,830,58 5 (100.0)	1,517,196 (100.0)	15,207,691 (100.0)	9,470,322 (100.0)	14,256,511 (100.0)	7,850,877 (100.0)	8,439,647 (100.0)	2,442,217 (100.0)

Harvest

USFWS woodcock wing receipt studies show a cluster of high harvest in southeastern Louisiana but most of BCR 27 falls within the zone of less than 101 woodcock wings submitted per county. A modest increase in wing receipts is noted for western Panhandle of Florida, coastal South Carolina and coastal North Carolina.

Harvest data are not available for counties within the BCR, but statewide averages for those states with the majority of area within the BCR illustrate harvest densities (Kelley and Rau 2005). In 2005, excluding Louisiana, states within BCR 27 accounted for 10,800 woodcock harvested by 92,00 hunters.

Population Trends

Only Virginia is included within the area surveyed through singing ground estimates.

The Christmas Bird Count (CBC) (http://www.audubon.org/bird/cbc/hr/index.html) provides a glimpse into population trends but is subject to extreme variation due to weather effects on migration, differential observability and differential observer effort. CBC data for states included in the BCR were aggregated for 1970-2004. CBC data reflects a generally stable population since the start of the 1980s with significant annual variation (Figure 5).

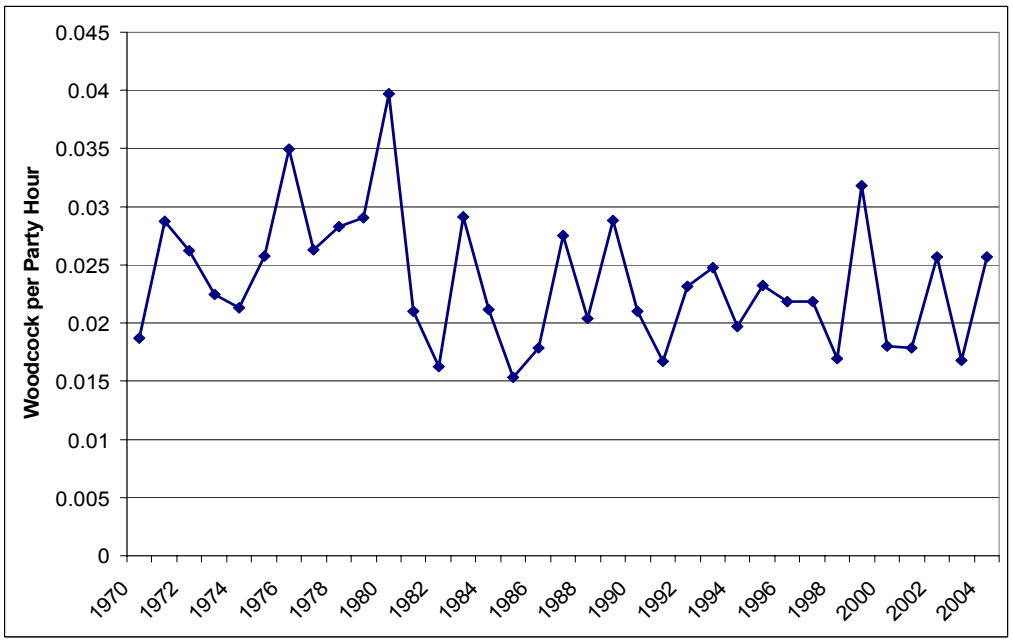


Figure 5. Christmas Bird Count results from 1970-2004 from states in BCR 27.

Habitat Goals and Management Recommendations

Viginia is the only state in the BCR for which population data exist. There is a population deficit of 5,355 singing males in Virginia (Table 6). Approximately 497,000 acres of early succession habitat needs to be created to eliminate the population deficit. Woodcock population estimates are not available for the remainder of BCR 27, so habitat goals and management recommendations are based on a comparison of the best available index to woodcock habitat – the percentage of forestland occupied by early successional habitat (small diameter plus non-stocked). Overall, by this measure, woodcock habitat has increased in BCR 27 by 3.9% or 3.7 million acres (Table 5). Therefore, habitat management goals are to sustain this level of early successional habitat.

Hunter et al. (2001) suggest that the gross index of early successional habitat may over-represent early successional habitat because of changes in the intensity by which forest industry lands are managed. Woodcock may be a good example of a species impacted by lower quality early successional habitat. Straw et al. (1994) describe high quality winter range for woodcock as early successional lands with high stem density, intact understory, and vegetative diversity. Such structure provides abundant earthworms and protection from predation. Site preparation following clearcutting (especially bedding, ditching and mounding) affects earthworm abundance and vegetative composition may be lowered. Herbicides applied to kill competing hardwoods results in lowered hardwood stem density, lowered vegetative diversity and simplified understory composition. Rapid crown closure of planted pine trees, especially those planted stands that are pre-commercially thinned, reduces understory vegetation.

Habitat management recommendations, therefore, are based not on acreage but on striving to achieve the following best management practices

1. Employ a Management Unit Approach
    a. 500-1000 Acre Unit should represent a Viable Population Unit
2. Center Management Unit on Wetland or Wet, Moist or Poorly Drained, Loamy Soil Type
    a. National Wetland Inventory: Palustrine broad-leaved, deciduous or Palustrine deciduous shrub/scrub
    b. Timber Stand Cruise Data
    c. Soil type map: Poorly drained, loams
3. Manage for Quality Winter Habitat
    a. Employ Even-aged Management on Uplands Adjacent to Wet Areas
    b. 5 Acre Minimum Final Harvest Size
    c. Emphasize Shade-intolerant Hardwoods
    d. Use Short Rotations
    e. Rely on Natural Regeneration
    f. Delay, Limit or Exclude Site Preparation and Herbicides
4. Roosting Field Component
    a. Bare Ground Intermixed with Scattered Weeds
    b. Preference for larger, more open roosting fields with wetter soils
    c. Non-forested Openings -- < 1 Mile from Cover
    d. Make Log Landings as Large as Possible
    e. Young Plantations Following Herbicide – Especially if Mosaics of Non-planted Areas
    f. Maintain old fields and manage grazing on active pastures
5. Metapopulation Approach

a. 5 Management Units Within 1-2 Miles
b. Expect Some Interchange Between Units
c. Adjacent Units Available to Repopulate Local Extinctions

Table 5: Trends in forest cover and woodcock populations and habitat management goals for BCR 27.

	Historic			Current				
	Total Forest Land	ESH	%ESH	Total Forest Land	ESH	%ESH	% Change	Acres Changed
Alabama	13,798,600	4,647,500	33.7%	15,207,691	7,734,418	50.9%	17.2%	3,086,918
Florida	9,937,200	4,356,500	43.8%	9,470,322	4,125,189	43.6%	-0.3%	-231,311
Georgia	14,520,000	4,960,700	34.2%	14,256,511	5,910,455	41.5%	7.3%	949,755
Kentucky	360,650	79,650	22.1%	248,959	28,985	11.6%	-10.4%	-50,665
Louisiana	1,507,700	389,900	25.9%	1,517,196	489,597	32.3%	6.4%	99,697
Mississippi	16,040,400	8,271,000	51.6%	17,830,585	6,988,073	39.2%	-12.4%	-1,282,927
North Carolina	9,389,368	3,042,682	32.4%	8,439,648	4,221,590	50.0%	17.6%	1,178,908
South Carolina	7,956,800	2,546,100	32.0%	7,850,878	2,474,807	31.5%	-0.5%	-71,293
Tennessee	2,146,300	665,900	31.0%	2,569,825	832,418	32.4%	1.4%	166,518
Virginia	2,750,693	759,687	27.6%	2,533,138	613,161	24.2%	-3.4%	-146,526
Total	78,407,711	29,719,619	37.9%	79,924,752	33,418,693	41.8%	3.9%	3,699,074

Table 6. Calculation of population deficits and habitat goals for American woodcock in the Virginia portion of Bird Conservation Region 27.

	Historical[1]		Current
Total land area (acres)			
Virginia	4,764,122		4,764,122
Manageable acres			
Virginia	2,750,784		2,533,138
Population of singing males			
Virginia	8,189		2,186
Population deficit (singing males)[2]			
Virginia		5,355	
Habitat goal (acres)[2,3]			
Virginia		496,951	

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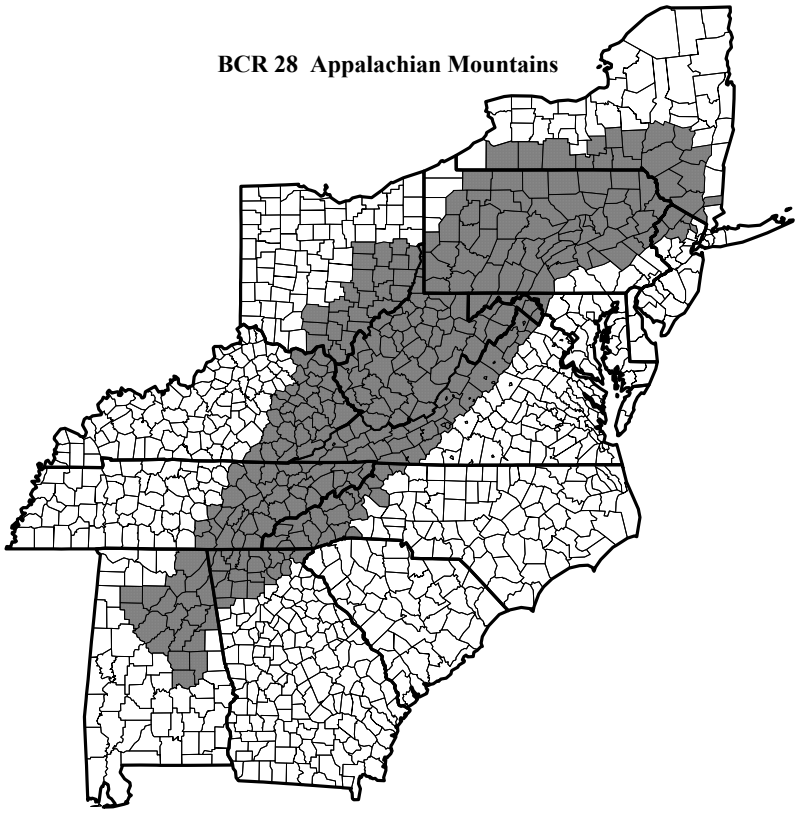
Bird Conservation Region 28: Appalachian Mountains

Affected states: Alabama, Georgia, Kentucky, Maryland, New York, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia

Current area of forest land: 66,892,834 acres (9,083,081 acres of small diameter and non-stocked forest)

Woodcock trend estimate (% change/year)	1966-2004: - 2.0 1994-2004: - 0.9	Woodcock population estimate (singing males/mi^2)	1970: 179,495 2004: 94,045



Physiography and Habitat Description

The Appalachian Mountains Bird Conservation Region (BCR 28) connects the primary woodcock wintering grounds in the southeastern U.S. with the high-density breeding grounds in the northern-most part of the eastern flyway. BCR 28 includes parts of 12 states, extending from southern New York to northeastern Alabama and encompassing more than 67 million acres or 104 thousand square miles. Elevations range from over 6,500 feet in the peaks of the southern Appalachians to less than 200 feet in some valleys. Major physiographic regions included in this area are the Blue Ridge, Ridge and Valley, Cumberland Plateau, Ohio Hills, and the Allegheny Plateau. It also includes the Great Smoky Mountains.

While portions of plateaus and valleys of the BCR are in agricultural use, the majority of this BCR is forested. Fertile valleys with reverting farmlands and wooded riparian areas are common. High

elevation wetland complexes such as the Canaan Valley (WV) and Pocono Mountains (PA) regions offer important moist soils areas for both migrating and breeding woodcock. Broad river valleys between parallel ridges in the ridge and valley region host high densities of migrating woodcock in spring and fall.

Mature forests dominate the Appalachians. Nearly 60% of BCR 28 forestland is characterized as large diameter, 26% as medium diameter and 13% as seedling/sapling (less than .003% is nonstocked). Between the baseline (historic) forest inventories and the most recent, total forested acres increased by about 1.5%. The amount of forestland comprised of small diameter trees declined by about 16% over the same timeframe (Table 1). Forest Service FIA data confirmed that, for states with increasing early-successional habitat trends, those increases occurred primarily on non-industrial private forests while the major declines occurred on public lands, especially on national forests.

In West Virginia, which is entirely within BCR 28, early successional (small diameter) forest decreased 27% from 1989 to 2000. In Pennsylvania, the extent of seedling/sapling habitat reached a 50-year low of 10% in 2004 (USDA Forest Service). Acres of early successional forest declined 24% between 1989 and 2002. In Ohio, early successional forest declined by 48% from 1993 – 2002. The northeastern portion of Alabama included in BCR 28 has shown an 18% increase in early successional forest, with increases occurring on both public and private lands. Early successional forests increased in New Jersey and Maryland within BCR 28 (3 counties each) during the 1990's.

Aspen forest is a minor component (<1%) of the BCR as a whole, but does occur in significant stands north of Interstate 80. More than 80% of the aspen in the BCR occurs in PA and NY (Table 2). Dominant forest types include oak-hickory and maple-beech-birch. Mixed upland hardwoods are common and well-distributed across the BCR (Table 3). Most of the early successional forest habitat is found within the mixed upland hardwood, loblolly pine, sugar maple-beech-yellow birch, and oak-hickory forest types (Table 4).

As expected in mountainous terrain, the majority of forests in BCR 28 are on relatively dry upland sites. However, over 9 million acres of forest are characterized as being on moist slopes, coves, or small drains (Table 5). These areas may offer particularly good opportunities for management.

Eighty-one percent of the timberland in the Appalachians is privately owned. National Forests represent 9% of the public forestland within BCR 28, but nearly 17% south of Pennsylvania. The states own 8% of the public forests (Table 6). The average extent of forests 0-10 years of age on national forests in BCR 28 is 4.2% . Forests 0-10 years-old declined by 4% on southern Appalachian National Forests since the 1990's. Just 1% and 2% of the Monongahela (West Virginia) and Chattahoochee (Tennessee) National Forests are in the 0-10 year age class, respectively. The 0-10 year age class on the George Washington and Jefferson National Forests declined from 4.3% in 1989 to 1.8% in 2002.

Population and Habitat Goals

To restore woodcock densities in BCR 28 to those observed during the early 1970s, a total of over 88,000 singing males need to be added to the population (Table 7). This estimate pertains only to manageable acres in states covered by the Singing-ground Survey. Achieving this goal will require the creation of nearly 3 million acres of new woodcock habitat.

Table 1. Current and historic (ca. 1975-90) stand-size distribution of forestland in Bird Conservation Region (BCR) 28 and portions of individual states within the BCR .

	Current stand-size distribution (acres)					Historic stand-size distribution (acres)				
Area	Total forestland[1]	Large diameter[2,3]	Medium diameter[2,4]	Small diameter[2,5]	Non-stocked[2,6]	Total forestland[1]	Large diameter[2,3]	Medium diameter[2,4]	Small diameter[2,5]	Non-stocked[2,6]
Alabama	5,750,030 (8)	1,975,889 (5)	1,301,691 (7)	2,458,767 (29)	13,682 (6)	5,509,772 (8)	1,798,234 (5)	1,611,207 (9)	2,089,738 (20)	10,593 (6)
Georgia	2,714,230 (4)	1,421,771 (4)	823,980 (4)	468,479 (5)	0	2,888,916 (4)	1,538,505 (4)	773,895 (4)	550,869 (5)	25,647 (15)
Kentucky	5,624,924 (8)	3,975,652 (8)	1,170,684 (7)	474,202 (5)	4,385 (2)	5,671,524 (9)	3,584,800 (10)	1,314,607 (7)	772,117 (7)	0
Maryland	546,773 (1)	335,585 (1)	143,706 (1)	65,095 (1)	2,386 (1)	587,916 (1)	364,001 (1)	170,124 (1)	53,791 (<1)	0
New Jersey	460,353 (1)	364,590 (1)	71,378 (<1)	18,424 (<1)	5,961 (3)	460,871 (1)	364,741 (2)	83,594 (1)	12,536 (<1)	0
North Carolina	3,373,843 (5)	2,253,451 (6)	638,690 (4)	481,702 (6)	0	3,453,436 (5)	2,242,249 (6)	913,115 (5)	285,153 (3)	12,919 (8)
New York	5,680,499 (8)	3,347,456 (8)	1,627,218 (9)	654,520 (7)	51,305 (21)	5,438,042 (8)	3,037,601 (8)	1,544,102 (8)	845,778 (8)	10,561 (6)
Ohio	4,650,744 (7)	2,939,809 (7)	1,130,723 (6)	555,423 (6)	24,789 (10)	4,261,413 (7)	2,194,634 (6)	989,330 (5)	1,072,784 (10)	4,665 (3)
Pennsylvania	14,861,736 (22)	8,590,550 (21)	4,584,089 (25)	1,645,394 (19)	41,703 (17)	14,510,890 (22)	7,694,840 (21)	4,620,636 (25)	2,174,756 (21)	20,658 (12)
Tennessee	5,591,151 (8)	3,344,747 (8)	1,676,562 (9)	560,411 (6)	9,431 (4)	5,710,018 (9)	3,081,455 (8)	1,678,495 (9)	944,348 (9)	5,720 (3)
Virginia	5,841,585 (9)	3,126,582 (8)	2,131,932 (12)	581,794 (7)	1,277 (1)	5,478,689 (8)	3,127,141 (9)	1,751,333 (9)	522,305 (5)	77,910 (46)
West Virginia	11,796,966 (18)	8,196,857 (21)	2,636,857 (15)	879,639 (10)	84,312 (35)	11,900,346 (18)	7,472,484 (20)	3,214,667 (17)	1,210,642 (12)	2,553 (1)
Total BCR	66,892,834	39,872,939	17,937,510	8,843,850	239,231	65,871,833	36,500,685	18,665,105	10,534,817	171,226

[1] Percentages in parentheses. Percentages for total forestland refer to percent of column total.
[2] Percentages for various diameter categories and non-stocked category refer to percent of total forestland for current and historic time periods within each state.
[3] Softwoods at least 9 inches, and hardwoods at least 11 inches in diameter at breast height.
[4] Trees at least 5 inches in diameter at breast height, but smaller than large diameter.
[5] Saplings 1-5 inches diameter at breast height, plus softwood seedlings more than 6 inches tall and hardwood seedlings more than 12 inches tall.
[6] Commercial forest land on which stocking of trees is less than 16.7 percent.

Table 2. Percent occurrence of forest types between states within BCR 28.

Forest Type	AL	GA	KY	MD	NJ	NY	NC	OH	PA	TN	VA	WV	Total
Aspen	0.0%	0.0%	0.0%	0.0%	0.0%	35.8%	0.0%	13.8%	47.9%	0.0%	0.0%	2.6%	100%
Bald Cypress/water tupelo	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100%
B. Ash/Am. Elm/R. Maple	0.0%	0.0%	0.0%	6.3%	16.5 %	16.3%	0.0%	0.9%	0.0%	0.0%	0.0%	60.0%	100%
Black Cherry	0.0%	0.0%	0.0%	3.9%	0.7%	8.6%	0.0%	7.8%	62.9%	0.0%	0.0%	16.2%	100%
Black Locust	0.0%	0.0%	11.8%	3.8%	0.0%	0.0%	0.0%	5.9%	13.0%	1.0%	0.0%	64.5%	100%
Black Walnut	0.0%	0.0%	7.0%	0.8%	0.0%	10.6%	0.0%	30.7%	43.2%	0.0%	0.0%	7.7%	100%
Cherry/Ash/Y. Poplar	0.0%	0.0%	0.3%	0.0%	0.0%	34.3%	0.0%	14.2%	50.6%	0.6%	0.0%	0.0%	100%
Chestnut Oak	4.8%	9.6%	10.6%	0.5%	0.4%	1.4%	6.8%	1.7%	19.4%	11.8%	21.6%	11.3%	100%
Chestnut/Black/Scarlet Oak	3.1%	0.0%	12.2%	0.0%	0.0%	5.9%	0.0%	11.4%	66.8%	0.5%	0.0%	0.0%	100%
Cottonwood	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	74.7%	25.3%	0.0%	0.0%	0.0%	100%
Douglas Fir	0.0%	0.0%	0.0%	0.0%	0.0%	87.1%	0.0%	0.0%	12.9%	0.0%	0.0%	0.0%	100%
Eastern Hemlock	0.8%	1.2%	15.0%	0.0%	0.0%	20.9%	1.6%	0.0%	33.3%	10.1%	6.7%	10.4%	100%
Eastern Red Cedar	2.0%	1.6%	4.3%	0.0%	3.5%	3.0%	0.0%	0.0%	0.0%	38.4%	44.4%	2.9%	100%
E. Red Cedar/Hardwood	34.1%	0.0%	2.8%	5.4%	5.1%	5.7%	0.0%	0.0%	0.0%	14.6%	28.9%	3.3%	100%
Elm/Ash/Locust	0.0%	0.0%	2.5%	0.0%	0.0%	4.6%	0.0%	36.3%	56.6%	0.0%	0.0%	0.0%	100%
Hard Maple/Basswood	0.0%	0.0%	2.9%	0.0%	0.0%	38.2%	0.0%	7.5%	50.1%	1.3%	0.0%	0.0%	100%
Loblolly Pine	70.4%	20.3%	0.0%	0.0%	0.0%	0.0%	0.6%	0.0%	0.0%	8.0%	0.7%	0.0%	100%
Loblolly Pine/Hardwood	74.3%	15.7%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	9.2%	0.0%	0.5%	100%
Longleaf Pine	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100%
Longleaf Pine/Oak	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100%
Mixed Upland Hardwoods	6.3%	1.2%	3.3%	1.6%	1.4%	1.9%	13.4%	5.0%	4.8%	9.7%	8.3%	43.0%	100%

Non-stocked	0.0%	0.0%	2.1%	1.1%	2.9%	21.6%	0.0%	4.5%	22.1%	4.5%	0.6%	40.5%	100%
N. Red Oak	1.0%	0.6%	4.0%	1.2%	1.1%	18.2%	2.9%	1.6%	37.7%	1.8%	11.7%	18.2%	100%
Other	0.0%	0.0%	0.0%	0.0%	0.0%	76.8%	0.0%	0.0%	23.2%	0.0%	0.0%	0.0%	100%
Other Exotic Softwoods	0.0%	0.0%	0.0%	3.0%	0.0%	57.0%	0.0%	0.0%	40.0%	0.0%	0.0%	0.0%	100%
Other Pine/Hardwood	7.6%	9.4%	6.5%	0.0%	0.0%	0.0%	7.0%	1.7%	7.1%	26.8%	30.4%	3.5%	100%
Paper Birch	0.0%	0.0%	0.0%	0.0%	0.0%	14.1%	0.0%	0.0%	85.9%	0.0%	0.0%	0.0%	100%
Pitch Pine	0.0%	5.9%	11.9%	0.0%	0.0%	0.0%	7.7%	16.9%	13.0%	3.1%	24.1%	17.4%	100%
Post Oak/Blackjack Oak	23.6%	14.0%	14.5%	0.0%	1.8%	0.0%	4.1%	1.0%	0.0%	10.5%	15.2%	15.3%	100%
Red Maple/Lowland	21.1%	0.0%	0.0%	0.0%	17.9 %	15.8%	0.0%	2.9%	42.3%	0.0%	0.0%	0.0%	100%
Red Maple/Oak	1.3%	0.0%	10.8%	0.4%	0.4%	10.6%	0.0%	5.6%	55.7%	0.8%	0.0%	14.3%	100%
Red Maple/Upland	0.0%	0.0%	0.0%	1.4%	0.6%	29.5%	0.0%	0.2%	54.1%	0.0%	0.0%	14.3%	100%
Red Pine	0.0%	0.0%	0.0%	13.3%	0.0%	64.7%	0.0%	0.0%	22.0%	0.0%	0.0%	0.0%	100%
Red Spruce	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	58.5%	0.0%	0.0%	0.0%	7.9%	33.6%	100%
River Birch/Sycamore	0.0%	1.0%	10.8%	2.0%	0.0%	17.9%	0.0%	14.5%	15.9%	4.8%	3.1%	30.0%	100%
Sassafras/Persimmon	0.8%	0.0%	3.2%	0.0%	0.0%	0.0%	0.0%	44.1%	40.9%	0.0%	0.0%	11.0%	100%
Scarlet Oak	0.0%	0.0%	31.9%	4.1%	0.0%	0.0%	0.0%	0.0%	16.8%	7.6%	0.0%	39.6%	100%
Scotch Pine	0.0%	0.0%	0.0%	0.0%	0.0%	58.7%	0.0%	0.0%	41.3%	0.0%	0.0%	0.0%	100%
Shortleaf Pine	25.3%	37.4%	8.3%	0.0%	0.0%	0.0%	11.4%	0.0%	6.9%	10.8%	0.0%	0.0%	100%
Shortleaf Pine/Oak	27.0%	26.9%	14.7%	0.0%	0.0%	0.0%	7.2%	0.0%	0.0%	20.6%	2.3%	1.3%	100%
Silver Maple/Am. Elm	0.0%	0.0%	6.9%	0.0%	0.0%	0.0%	0.0%	83.8%	9.3%	0.0%	0.0%	0.0%	100%
S. Scrub Oak	0.0%	29.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	70.3%	0.0%	0.0%	0.0%	100%

Swamp Chestnut Oak/Cherrybark Oak	86.5%	0.0%	13.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100%
Sweetgum/Nuttall oak/Willow Oak	97.1%	2.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100%
Sweetbay/Swamp Tupelo/Red Maple	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100%
Sugarberry/Hackberry/Elm/Gr. Ash	26.6%	6.2%	7.6%	0.0%	0.7%	9.1%	0.0%	20.4%	24.5%	1.1%	0.0%	3.9%	100%
Sugar Maple/Beech/Y. Birch	0.0%	0.0%	3.9%	0.9%	1.1%	21.7%	1.5%	6.1%	42.4%	0.3%	1.6%	20.5%	100%
Sweetgum/Yellow poplar	46.9%	12.0%	23.1%	0.0%	0.0%	0.0%	2.4%	0.0%	0.0%	15.6%	0.0%	0.0%	100%
Sycamore/Pecan/Am. Elm	6.6%	6.1%	3.3%	0.0%	0.0%	9.2%	0.0%	44.8%	11.3%	1.2%	0.5%	17.1%	100%
Table Mountain Pine	0.0%	8.9%	0.0%	0.0%	0.0%	0.0%	3.0%	0.0%	3.1%	0.0%	72.2%	12.8%	100%
Tamarac	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	100%
Virginia Pine	17.8%	11.5%	11.5%	0.2%	0.0%	0.0%	6.4%	7.4%	6.3%	22.9%	4.7%	11.2%	100%
Virginia Pine/S. Red Oak	12.6%	15.0%	8.3%	0.0%	0.0%	0.0%	4.5%	4.9%	3.1%	21.9%	6.6%	23.1%	100%
Yellow Poplar	2.8%	0.0%	47.1%	0.0%	0.5%	0.0%	0.0%	11.4%	5.4%	1.6%	0.0%	31.1%	100%
Y. Poplar/White/Red Oak	3.9%	9.3%	13.4%	0.0%	0.0%	0.0%	15.6%	10.8%	6.9%	8.9%	24.0%	7.2%	100%
White Pine	0.0%	4.4%	4.3%	0.7%	0.0%	16.2%	18.0%	5.9%	18.0%	1.9%	23.5%	7.1%	100%
White Pine/Hemlock	0.0%	5.3%	4.0%	0.0%	0.0%	21.9%	13.8%	0.0%	15.2%	18.9%	15.9%	5.0%	100%
W. Pine/R. Oak/W. Ash	0.0%	5.4%	1.7%	0.0%	0.0%	21.3%	17.7%	5.6%	21.0%	6.8%	19.3%	1.2%	100%
White Oak	5.6%	2.8%	16.0%	2.2%	1.4%	0.0%	0.3%	10.1%	21.7%	5.4%	4.7%	29.8%	100%
White/Red Oak/Hickory	7.6%	4.1%	16.0%	0.6%	0.3%	4.0%	3.0%	9.9%	19.3%	15.7%	10.4%	9.3%	100%
White Spruce	0.0%	0.0%	0.0%	0.0%	0.0%	6.7%	0.0%	0.0%	93.3%	0.0%	0.0%	0.0%	100%
Willow	5.1%	11.6%	31.9%	0.0%	7.1%	6.4%	0.0%	22.3%	2.6%	0.0%	0.6%	12.3%	100%

Table 3. Forest composition of timberland within Bird Conservation Region 28 (acres; percent of column total in parentheses).

Forest Type	AL	GA	KY	MD	NJ	NY	NC	OH	PA	TN	VA	WV
Aspen	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	128,326 2.3%	0 0.0%	49,567 1.1%	171,762 1.1%	0 0.0%	0 0.0%	9,169 0.1%
Bald Cypress/water tupelo	14,384 0.2%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%
B. Ash/Am. Elm/R. Maple	0 0.0%	0 0.0%	0 0.0%	11,948 2.2%	31,444 6.8%	31,101 0.5%	0 0.0%	1,741 <0.1%	0 0.0%	0 0.0%	0 0.0%	114,448 1.0%
Black Cherry	0 0.0%	0 0.0%	0 0.0%	32,945 6.0%	5,747 1.2%	73,153 1.3%	0 0.0%	66,698 1.4%	538,302 3.6%	0 0.0%	0 0.0%	138,407 1.2%
Black Locust	0 0.0%	0 0.0%	25,831 0.5%	8,420 1.5%	0 0.0%	0 0.0%	0 0.0%	12,958 0.3%	28,662 0.2%	2,201 <0.1%	0 0.0%	141,581 1.2%
Black Walnut	0 0.0%	0 0.0%	9,924 0.2%	1,075 0.2%	0 0.0%	15,020 0.3%	0 0.0%	43,574 0.9%	61,251 0.4%	0 0.0%	0 0.0%	10,937 0.1%
Cherry/Ash/Y. Poplar	0 0.0%	0 0.0%	3,835 <0.1%	0 0.0%	0 0.0%	389,636 6.8%	0 0.0%	161,575 3.5%	574,843 3.8%	6,358 0.1%	0 0.0%	0 0.0%
Chestnut Oak	225,624 3.9%	450,624 15.7%	499,539 8.9%	22,502 4..1%	20,937 4.5%	68,237 1.2%	322,914 8.6%	80,545 1.7%	915,034 6.1%	556,735 10.0%	1,020,866 18.2%	534,547 4.5%
Chestnut/Black/Scarlet Oak	55,232 1.0%	0 0.0%	218,523 3.9%	0 0.0%	0 0.0%	106,290 1.9%	0 0.0%	202,912 4.4%	1,193,900 8.0%	9,606 0.2%	0 0.0%	0 0.0%
Cottonwood	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	16,888 0.4%	5,726 <0.1%	0 0.0%	0 0.0%	0 0.0%
Douglas Fir	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	12,379 0.2%	0 0.0%	0 0.0%	1,835 <0.1%	0 0.0%	0 0.0%	0 0.0%
Eastern Hemlock	5,617 0.1%	8,121 0.3%	100,942 1.8%	0 0.0%	0 0.0%	141,136 2.5%	10,877 0.3%	0 0.0%	224,183 1.5%	67,756 1.2%	45,481 0.8%	70,007 0.6%
Eastern Red Cedar	2,455 <0.1%	2,002 0.1%	5,360 0.1%	0 0.0%	4,377 1.0%	3,755 0.1%	0 0.0%	0 0.0%	0 0.0%	48,277 0.9%	55,843 1.0%	3,696 <0.1%
E. Red Cedar/Hardwood	67,215 1.2%	0 0.0%	5,585 0.1%	10,692 2.0%	9,972 2.2%	11,148 0.2%	0 0.0%	0 0.0%	0 0.0%	28,724 0.5%	56,932 1.0%	6,557 <0.1%
Elm/Ash/Locust	0 0.0%	0 0.0%	7,262 0.1%	0 0.0%	0 0.0%	13,314 0.2%	0 0.0%	104,868 2.3%	163,567 1.1%	0 0.0%	0 0.0%	0 0.0%
Hard Maple/Basswood	0 0.0%	0 0.0%	21,895 0.4%	0 0.0%	0 0.0%	291,198 5.1%	0 0.0%	57,428 1.2%	382,277 2.6%	10,087 0.2%	0 0.0%	0 0.0%
Loblolly Pine	1,411,975 24.5%	407,174 14.1%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	12,999 0.3%	0 0.0%	0 0.0%	160,533 2.9%	13,182 0.2%	0 0.0%
Loblolly Pine/Hardwood	562,649 9.8%	119,018 4.1%	2,180 <0.1%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	69,911 1.2%	0 0.0%	3,978 <0.1%
Longleaf Pine	146,239 2.5%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%
Longleaf Pine/Oak	33,489 0.6%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%
Mixed Upland Hardwoods	758,472 13.2%	143,146 5.0%	399,480 7.1%	193,073 35.3%	169,014 36.7	232,967 4.1%	1,614,746 42.9%	607,803 13.0%	581,601 3.9%	1,173,858 21.0%	995,367 17.8%	5,187,114 44.0%

Non-stocked	0 0.0%	0 0.0%	4,385 0.1%	2,386 0.4%	5,961 1.3%	44,955 0.8%	0 0.0%	9,432 0.2%	45,892 0.3%	9,431 0.2%	1,277 <0.1%	84,312 0.7%
N. Red Oak	11,542 0.2%	7,223 0.3%	45,829 0.8%	13,514 2.5%	12,131 2.6%	206,520 3.6%	33,393 0.9%	18,235 0.4%	428,862 2.9%	20,601 0.4%	132,925 2.4%	206,555 1.7%
Other	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	496 <0.1%	0 0.0%	0 0.0%	150 <0.1%	0 0.0%	0 0.0%	0 0.0%
Other Exotic Softwoods	0 0.0%	0 0.0%	0 0.0%	3,203 0.6%	28 <0.1%	60,679 1.1%	0 0.0%	0 0.0%	42,613 0.3%	0 0.0%	0 0.0%	0 0.0%
Other Pine/Hardwood	55,908 1.0%	68,651 2.4%	47,329 0.8%	0 0.0%	0 0.0%	0 0.0%	51,320 1.4%	12,537 0.3%	52,151 0.3%	195,894 3.5%	222,728 4.0%	25,652 0.2%
Paper Birch	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	5,900 0.1%	0 0.0%	0 0.0	35,935 0.2%	0 0.0%	0 0.0%	0 0.0%
Pitch Pine	0 0.0%	11,217 0.4%	22,386 0.4%	0 0.0%	0 0.0%	0 0.0%	14,617 0.4%	31,887 0.7%	24,495 0.2%	5,899 0.1%	45,486 0.8%	32,838 0.3%
Post Oak/Blackjack Oak	81,752 1.4%	48,474 1.7%	50,321 0.9%	0 0.0%	6,107 1.3%	0 0.0%	14,205 0.4%	3,572 0.1%	0 0.0%	36,541 0.6%	52,782 0.9%	53,029 0.4%
Red Maple/Lowland	13,588 0.2%	0 0.0%	0 0.0%	0 0.0%	11,545 2.5%	10,224 0.2%	0 0.0%	1,867 <0.1%	27,291 0.2%	0 0.0%	0 0.0%	0 0.0%
Red Maple/Oak	15,682 0.3%	0 0.0%	130,185 2.3%	4,894 0.9%	4,580 1.0%	128,064 2.2%	0 0.0%	67,847 1.5%	670,602 4.5%	9,666 0.2%	0 0.0%	172,336 1.5%
Red Maple/Upland	0 0.0%	0 0.0%	0 0.0%	22,243 4.1%	9,658 2.1%	479,634 8.4%	0 0.0%	3,439 0.1%	878,693 5.9%	0 0.0%	0 0.0%	231,767 2.0%
Red Pine	0 0.0%	0 0.0%	0 0.0%	14,627 2.7%	0 0.0%	71,344 1.3%	0 0.0%	0 0.0%	24,227 0.2%	0 0.0%	0 0.0%	0 0.0%
Red Spruce	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	41,060 1.1%	0 0.0%	0 0.0%	0 0.0%	5,538 0.1%	23,590 0.2%
River Birch/Sycamore	0 0.0%	2,989 0.1%	32,869 0.6%	6,066 1.1%	0 0.0%	54,590 1.0%	0 0.0%	44,196 1.0%	48,396 0.3%	14,698 0.3%	9,476 0.2%	91,433 0.8%
Sassafras/Persimmon	3,075 <0.1%	0 0.0%	12,101 0.2%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	165,007 3.5%	152,876 1.0%	0 0.0%	0 0.0%	40,979 0.3%
Scarlet Oak	0 0.0%	0 0.0%	41,691 0.7%	5,398 1.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	21,972 0.1%	9,889 0.2%	0 0.0%	51,702 0.4%
Scotch Pine	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	77,101 1.4%	0 0.0%	0 0.0%	54,162 0.4%	0 0.0%	0 0.0%	0 0.0%
Shortleaf Pine	31,604 0.5%	46,672 1.6%	10,338 0.2%	0 0.0%	0 0.0%	0 0.0%	14,191 0.4%	0 0.0%	8,646 0.1%	13,503 0.2%	0 0.0%	0 0.0%
Shortleaf Pine/Oak	132,594 2.3%	132,030 4.6%	72,035 1.3%	0 0.0%	0 0.0%	0 0.0%	35,356 0.9%	0 0.0%	0 0.0%	101,322 1.8%	11,480 0.2%	6,580 <0.1%
Silver Maple/Am. Elm	0 0.0%	0 0.0%	6,462 0.1%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	78,623 1.7%	8,749 0.1%	0 0.0%	0 0.0%	0 0.0%
S. Scrub Oak	0 0.0%	6,972 0.2%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	16,524 0.1%	0 0.0%	0 0.0%	0 0.0%
Swamp Chestnut Oak/Cherrybark Oak	14,384 0.3%	0 0.0%	2,240 <0.1%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%
Sweetgum/Nuttall oak/Willow Oak	154,411 2.7%	4,648 0.2%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%
Sweetbay/Swamp Tupelo/Red Maple	2,794 <0.1%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%
Sugarberry/Hackberry/ Elm/Green Ash	54,340 0.9%	12,615 0.4%	15,451 0.3%	0 0.0%	1,459 0.3%	18,656 0.3%	0 0.0%	41,717 0.9%	50,055 0.3%	2,235 <0.1%	0 0.0%	8,024 0.1%

Sugar Maple/Beech/Y. Birch	0 0.0%	0 0.0%	387,258 6.9%	90,739 16.6%	111,434 24.2%	2,153,637 37.8%	149,410 4.0%	600,061 12.9%	4,199,741 28.0%	28,984 0.5%	155,161 2.8%	2,035,985 17.3%
Sweetgum/Yellow poplar	413,199 7.2%	105,787 3.7%	203,013 3.6%	0 0.0%	0 0.0%	0 0.0%	20,968 0.6%	0 0.0%	0 0.0%	137,569 2.5%	0 0.0%	0 0.0%
Sycamore/Pecan/Am. Elm	21,170 0.4%	19,460 0.7%	10,482 0.2%	0 0.0%	0 0.0%	29,413 0.5%	0 0.0%	143,892 3.1%	36,424 0.2%	3,841 <0.1%	1,606 <0.1%	54,792 0.5%
Table Mountain Pine	0 0.0%	4,711 0.2%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	1,591 <0.1%	0 0.0%	1,630 <0.1%	0 0.0%	38,368 0.7%	6,818 <0.1%
Tamarac	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	12,219 0.1%	0 0.0%	0 0.0%	0 0.0%
Virginia Pine	214,424 3.7%	139,226 4.8%	139,098 2.5%	2,343 0.4%	0 0.0%	0 0.0%	77,733 2.1%	89,822 1.9%	76,403 0.5%	276,205 4.9%	56,139 1.0%	134,701 1.1%
Virginia Pine/S. Red Oak	143,562 2.5%	170,684 5.9%	93,955 1.7%	0 0.0%	0 0.0%	0 0.0%	51,085 1.4%	55,632 1.2%	35,506 0.2%	248,439 4.4%	74,766 1.3%	262,701 2.2%
Yellow Poplar	21,909 0.4%	0 0.0%	364,616 6.5%	0 0.0%	4,056 0.9%	0 0.0%	0 0.0%	88,267 1.9%	41,966 0.3%	12,644 0.2%	0 0.0%	240,360 2.0%
Y. Poplar/White/Red Oak	150,188 2.6%	361,244 12.6%	522,176 9.3%	0 0.0%	0 0.0%	0 0.0%	607,517 16.1%	420,982 9.0%	267,558 1.8%	346,210 6.2%	934,145 16.7%	278,155 2.4%
White Pine	0 0.0%	36,112 1.2%	35,296 0.6%	6,171 1.1%	0 0.0%	133,771 2.3%	147,955 3.9%	48,384 1.0%	148,098 1.0%	15,815 0.3%	193,254 3.4%	58,826 0.5%
White Pine/Hemlock	0 0.0%	11,217 0.4%	8,356 0.1%	0 0.0%	0 0.0%	45,937 0.8%	28,870 0.8%	0 0.0%	31,837 0.2%	39,626 0.7%	33,443 0.6%	10,475 0.1%
W. Pine/R. Oak/W. Ash	0 0.0%	51,856 1.8%	15,752 0.3%	0 0.0%	0 0.0%	202,685 3.6%	168,204 4.5%	53,701 1.1%	200,364 1.3%	64,391 1.1%	184,354 3.3%	11,579 0.1%
White Oak	71,288 1.2%	35,560 1.2%	203,692 3.6%	28,590 5.2%	17,692 3.8%	0 0.0%	3,719 <0.1%	128,349 2.8%	277,242 1.8%	68,637 1.2%	60,498 1.1%	380,081 3.2%
White/Red Oak/Hickory	872,144 15.1%	464,039 16.1%	1,829,133 32.5%	65,945 12.1%	30,195 6.6%	452,861 7.9%	340,012 9.0%	1,129,562 24.3%	2,204,599 14.7%	1,795,064 32.1%	1,194,059 21.3%	1,066,253 9.0%
White Spruce	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	1,192 <0.1%	0 0.0%	0 0.0%	16,478 0.1%	0 0.0%	0 0.0%	0 0.0%
Willow	2,922 <0.1%	6,597 0.2%	18,117 0.3%	0 0.0%	4,015 0.9%	3,627 0.1%	0 0.0%	12,690 0.3%	1,502 <0.1%	0 0.0%	366 <0.1%	7,001 <0.1%
TOTAL	5,765,831	2,878,069	5,624,922	546,774	460,352	5,698,946	3,762,742	4,656,258	14,986,801	5,591,150	5,595,522	11,796,965

Table 4. Stand size class composition of the most common forest types found in the states within BCR 28.

Stand size class	Mixed Upland Hardwoods	White Oak/Red Oak/Hickory	Chestnut Oak	Y. Poplar/White Oak/Red Oak	White Oak	Loblolly Pine	Sweetgum/Yellow Poplar	White Pine/Red Oak/White Ash	Northern Red Oak	S. Maple/Beech/Yellow Birch	Virginia Pine	Virginia Pine/S. Red Oak	Yellow Poplar	Red Maple/Oak	Chestnut Oak/Black Oak/Scar let Oak	Cherry/Ash/ Yellow Poplar	All forest types
Alabama																	
Large	177,914	382,403	144,047	100,850	71,288	273,019	103,478	0	0	0	49,520	44,249	2,618	8,382	20,194	0	1,377,962
Medium	206,931	414,820	65,960	38,162	0	693,690	139,597	0	11,545	0	85,104	73,420	12,418	0	13,476	0	1,755,123
Small	373,627	74,921	15,617	11,176	0	445,266	170,124	0	0	0	79,800	25,892	6,872	7,300	21,562	0	1,232,157
Georgia																	
Large	19,533	333,754	276,668	295,494	35,560	38,629	24,843	0	7,223	0	87,928	78,135	0	0	0	0	1,197,767
Medium	38,627	112,511	173,956	37,521	0	213,684	25,665	0	0	0	40,026	55,182	0	0	0	0	697,172
Small	84,987	17,774	0	28,229	0	154,861	55,278	0	0	0	11,272	37,367	0	0	0	0	389,768
Kentucky																	
Large	190,175	1,421,002	442,706	393,075	165,817	0	78,991	8,169	45,829	350,700	52,636	37,020	211,541	77,194	188,928	0	3,663,783
Medium	93,299	340,425	48,337	106,367	27,842	0	81,810	7,583	0	22,794	41,926	51,110	127,301	21,278	29,595	0	999,667
Small	116,006	67,706	8,496	22,734	10,033	0	42,212	0	0	13,763	44,536	5,825	25,774	31,713	0	3,835	392,633
Maryland																	
Large	119,521	57,829	12,938	0	10,631	0	0	0	13,514	58,285	2,343	0	0	4,895	0	0	279,956
Medium	43,650	8,116	9,564	0	17,959	0	0	0	0	13,697	0	0	0	0	0	0	92,986
Small	29,902	0	0	0	0	0	0	0	0	18,757	0	0	0	0	0	0	48,659
New Jersey																	
Large	149,729	24,072	19,422	0	17,692	0	0	0	12,131	85,704	0	0	4,056	4,580	0	0	317,386
Medium	12,674	6,123	1,496	0	0	0	0	0	0	21,129	0	0	0	0	0	0	41,422
Small	6,611	0	0	0	0	0	0	0	0	4,601	0	0	0	0	0	0	11,212
New York																	
Large	19,003	254,494	33,995	0	0	0	0	147,713	186,984	1,519,203	0	0	0	34,363	56,241	57,375	2,309,371
Medium	44,626	181,861	17,121	0	0	0	0	51,336	19,535	554,704	0	0	0	78,459	50,049	177,753	1,175,444
Small	169,337	16,505	17,121	0	0	0	0	3,637	0	79,731	0	0	0	15,242	0	154,508	456,081
N. Carolina																	
Large	1,015,908	253,583	249,009	493,409	3,719	2,941	9,302	122,898	15,937	84,028	0	33,029	0	0	0	0	2,283,763
Medium	327,839	54,633	72,360	71,178	0	8,458	6,522	24,501	5,310	42,743	0	4,169	0	0	0	0	617,713
Small	271,000	31,795	1,545	42,930	0	1,600	5,144	20,805	12,146	22,639	0	13,887	0	0	0	0	423,491
Ohio																	
Large	206,194	822,141	65,602	274,056	118,936	0	0	53,701	18,235	476,473	57,089	55,632	57,023	16,290	182,622	49,515	2,453,509
Medium	256,056	216,708	14,943	58,820	9,413	0	0	0	0	84,965	14,287	0	12,958	23,619	20,290	81,453	793,512
Small	145,553	90,714	0	88,106	0	0	0	0	0	38,623	18,447	0	18,286	27,939	0	30,607	458,275

Table 5. Physiographic class composition (in thousands of acres) of the most common forest types found in the states within BCR 28.

	Forest Type													
Physiographic Class	Mixed Upland Hardwoods	White Oak/Red Oak/Hickory	Chestnut Oak	Y. Poplar/W. Oak/Red Oak	Loblolly Pine	Sweetgum/Yellow Poplar	W. Pine/R. Oak/White Ash	Northern Red Oak	Sugar Maple/Beech/Y. Birch	Virginia Pine	Red Maple/Oak	Chestnut Oak/B. Oak/Sc. Oak	Black Cherry/Yellow Poplar	All Forest Types
Bays & Pocasins	0	0	0	0	2.3	0	0	0	0	0	0	0	0	2.3
Broad Floodplains/ Bottomlands	29.9	18.2	4.3	4.9	0	9.6	0	2.0	26.2	0	0	0	0	95.2
Deep Sands	0	0	159.4	1.7	0	0	0	0	0	0	0	0	0	161.1
Dry Slopes	144.4	511.8	349.8	80.7	17.3	0	17.9	29.6	217.1	60.7	82.8	553.4	115.8	2,181.3
Dry Tops	384.2	708.7	1,397.8	132.8	20.7	0	78.3	71.7	60.7	141.2	65.0	294.6	0	3,355.5
Flatwoods	91.3	322.5	64.6	174.7	31.8	23.8	44.0	32.1	517.8	12.3	146.0	148.0	140.7	1,749.7
Moist Slopes & Coves	1,680.3	2,117.8	588.2	1,877.6	5.8	132.7	246.8	201.8	1,016.0	39.2	38.8	156.6	59.1	8,160.9
Narrow Floodplains/ Bottomlands	37.4	57.3	9.6	46.6	10.2	55.9	55.3	5.5	30.2	3.5	5.9	0	1.4	318.7
Other Hydric	0	0	0	0	0	0	0	0	5.8	0	0	0	0	5.8
Other Mesic	38.4	70.3	29.0	0	2.2	1.6	23.2	11.0	173.8	3.0	16.2	21.6	4.7	395.0
Other Xeric	12.1	17.2	6.1	0	0	0	0	0	2.6	6.5	0	0	0	44.5
Rolling Uplands	3,791.1	9,293.9	1,947.1	2,481.7	610.0	564.6	664.2	900.0	8,366.9	828.1	775.0	2,413.8	1,352.1	33,988.5
Small Drains	540.9	157.0	182.5	79.4	1.4	22.4	32.0	18.0	62.7	0	7.0	0	0	1,103.3
Swamps/Bogs	0	5.4	0	0	0	0	0	0	7.9	0	0	0	0	13.4
Total	6,750.1	13,280.1	4,738.4	4,879.9	701.8	810.7	1,161.8	1,271.6	10,487.7	1,094.5	1,136.6	3,588.0	1,673.8	50,400.7

Table 6. Forest ownership categories in Bird Conservation Region 28 (acres; percent of column total in parentheses)													
Ownership	Total BCR	AL	GA	KY	MD	NJ	NY	NC	OH	PA	TN	VA	WV
National Forest	5,961,170 9.0%	374,132 6.5%	484,927 17.6%	504,249 9.0%	0 0.0%	0 0.0%	0 0.0%	907,812 27.0%	218,510 4.8%	491,867 3.3%	567,907 10.1%	1,552,409 27.2%	859,357 7.4%
Dept. of Defense	71,458 0.1%	0 0.0%	0 0.0%	6,088 0.1%	0 0.0%	0 0.0%	19,208 0.3%	0 0.0%	0 0.0%	28,127 0.2%	18,035 0.3%	0 0.0%	40,463 0.4%
Other Federal	346,707 0.5%	55,621 1.0%	23,547 0.8%	50,460 0.9%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	33,418 0.2%	87,619 1.6%	8,357 0.2%	87,685 0.8%
State	5,324,402 8.0%	137,787 2.4%	20,935 0.8%	82,722 1.5%	226,133 48.7%	67,611 15.7%	451,752 7.9%	45,347 1.3%	274,401 6.0%	3,349,588 22.8%	286,393 5.1%	120,907 2.1%	260,826 2.3%
County/Municipal	823,811 1.2%	34,845 0.6%	27,615 1.0%	14,376 0.3%	0 0.0%	34,428 8.0%	135,631 2.4%	50,023 1.5%	24,780 0.5%	353,610 2.4%	37,379 0.7%	42,948 0.8%	68,176 0.6%
Other Local Government	46,792 0.2%	0 0.0%	0 0.0%	5,861 0.1%	0 0.0%	0 0.0%	15,242 0.3%	0 0.0%	12,126 0.3%	6,036 0.1%	7,527 0.1%	0 0.0%	0 0.0%
Private	53,591,127 81.0%	5,151,451 89.5%	2,204,604 79.8%	4,949,697 88.1%	238,644 51.3%	329,337 76.3%	5,077,110 89.1%	2,370,661 70.2%	4,024,593 88.4%	10,440,344 71.0%	4,610,041 82.1%	3,972,734 69.7%	10,221,911 88.5%
All	66,205,928 100%	5,753,835 100%	2,761,627 100%	5,613,453 100%	464,777 100%	431,375 100%	5,698,943 100%	3,373,843 100%	4,554,410 100%	14,702,990 100%	5,614,901 100%	5,697,355 100%	11,538,419 100%

Table 7. Calculation of population deficits and habitat goals for American woodcock in Bird Conservation Region 28[1].			
	Historical[2]		Current
Total land area (acres)			
Maryland	994,093		994,093
New Jersey	1,009,331		1,009,331
New York	9,287,142		9,287,142
Ohio	7,516,819		7,516,819
Pennsylvania	24,189,075		24,189,075
Virginia	9,151,878		9,151,878
West Virginia	15,507,040		15,507,040
Total	67,655,379		67,655,379
Manageable acres			
Maryland	587,916		464,777
New Jersey	460,871		431,375
New York	5,438,042		5,698,943
Ohio	4,261,413		4,554,410
Pennsylvania	14,510,890		14,702,990
Virginia	5,478,689		5,697,355
West Virginia	11,900,346		11,538,419
Total	42,638,167		43,088,269
Population of singing males			
Maryland	2,518		1,099
New Jersey	5,048		1,176
New York	38,704		22,817
Ohio	17,540		8,741
Pennsylvania	71,497		42,030
Virginia	13,068		4,284
West Virginia	31,120		13,898
Total	179,495		94,045
Population deficit (singing males)			
Maryland		892	
New Jersey		3,549	
New York		17,744	
Ohio		10,005	
Pennsylvania		30,414	
Virginia		9,306	
West Virginia		16,276	
Total		88,186	
Habitat goal (acres)			
Maryland		30,315	
New Jersey		120,663	
New York		603,293	
Ohio		340,169	
Pennsylvania		1,034,059	
Virginia		316,389	
West Virginia		553,368	
Total		2,998,256	

[1]Alabama, Georgia, Kentucky, and North Carolina are not include in the singing-ground survey and, therefore, are not included in the calculations for this BCR.

[2]Historical time period refers to ca. 1970-75.

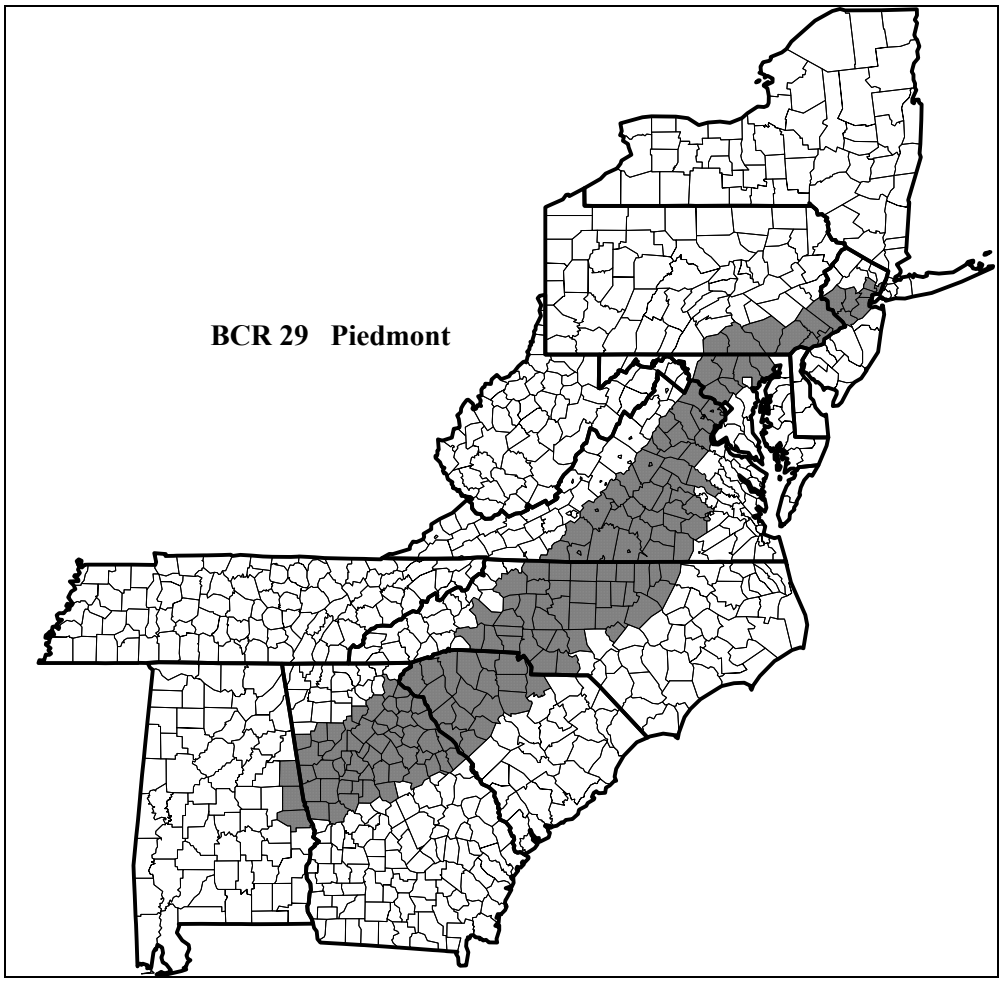
Bird Conservation Region 29: Piedmont

Affected states: Alabama, Georgia, South Carolina, North Carolina, Virginia, Maryland, Pennsylvania, New Jersey

Current area of forestland: 25,744,276 acres (6,958,474 acres of small diameter and non-stocked forest)

Woodcock trend estimate	1968-2004: - 3.25	Woodcock population estimate	1970: 22,745
(% change/year)	1995-2004: - 3.04	(singing males only)	2004: 6,127

(trend and population estimates exclude AL, GA, SC, and NC)



BCR 29, the Piedmont, is a transitional interface between the Appalachian Mountains and the Atlantic Coastal Plain. The Piedmont is relatively narrow (80 kilometers) in the north and wider (more than 200 kilometers) in the south. The topography ranges from gently rolling to hilly and formerly supported extensive forest. Today the area is fragmented, with a mixture of agriculture, forestland and suburban sprawl. Climate, soils to some extent, and vegetation change across this region, with change in latitude.

Physiography and Habitat Description

The region encompasses 48,085,255 acres and is 56% forested. Forest cover ranged from a low of 19% in Pennsylvania to 80% in the 3-county portion of Alabama in the BCR. Between the current and baseline forest inventories (Table 1), there was a loss of 2,195,124 acres (-7.8%). The largest proportional losses were in Maryland (-35%) and New Jersey (-21.2%) while Alabama gained timberland by 13%. While there was a net gain of early-successional (small diameter and non-stocked stands) forests by 63,224 acres (1%), the gains were in the Georgia, North and South Carolina portions of the BCR. The northern section (woodcock breeding part) of the BCR not only lost 510,000 acres of early-successional forestland, but the proportion in early-successional stages of growth went 26% to 22%.

Major forest types include loblolly pine (25.8%), white oak/red oak/hickory (12.5%), mixed upland hardwoods (10.5%), yellow poplar/white oak/red oak (9.5%), loblolly pine/hardwood (9.2%), and sweetgum/yellow poplar (8.3%; tables 2 and 3). Types changed with latitude. All loblolly pine was in Virginia and states south of it. Oak/hickory was major type in all states, gaining in dominance from North Carolina through Pennsylvania. Some oak species were more dominant in the southern Piedmont while chestnut/black/scarlet/ and northern red oak replaced them in the northern Piedmont. Typed stands of yellow poplar, and hardwoods like maples/beech/birch, cherry and ash were rare south of Maryland. Forest types with substantial proportions ($\geq$25%), and acreages >1 million in small trees tended to be in the southern part of the BCR and were dominated by pines (Table 4). Regions with the most forestland in early-successional stages of growth are considered more as wintering range for woodcock. This habitat situation in contrasted in the northern section of the BCR, where breeding woodcock surveys are conducted, with fewer pines and also less forest in small trees.

Rolling uplands is the dominant physiographic class (66% of total) in timberland (Table 5). The majority of area for 15 of 19 of the most common forest types was on rolling uplands. Narrow floodplains/bottomlands accounted for 7.3% of timbered areas and was the major acreage for the remaining four most common forest types within BCR 29. Small drains and beaver ponds followed, each with 5.7% of the total timberland.

Approximately 94% of the 26.9 million acres of forest is in private ownership and about 6% is in public forest. National forest has 2.5% of the public forest acreage, with 2 % under state/county/municipal authority and the remaining 1.4% in other federal categories (Table 6). The largest amount (and proportion at 7.4% of its forests) of national forest is in South Carolina, with 393,100 acres.

Woodcock Harvest and Population Status

BCR 29 is also a transitional area for woodcock breeding populations. From eastern Alabama into Virginia, it is used primarily for migration and wintering habitat while from Virginia to its terminus in northern New Jersey, it also serves as breeding range (no breeding woodcock surveys conducted south of Virginia), although the breeding densities are relatively low in this region (Sauer and Bortner 1991). Although Pennsylvania has only a small portion of the BCR, as a state it has more active woodcock hunters (9,000) than any state in the eastern region and more than the other states combined in BCR 29 (Kelley and Rau 2005). HIP estimates in 2005 for BCR 29 states were 17,300 hunters taking 21,000 birds.

In states in the BCR covered by the Singing-ground survey (Virginia, Maryland, Pennsylvania and New Jersey), there had been a long-term (1968-2004) decline of –3.25%/year in breeding woodcock populations (Kelly and Rau 2005). The estimated number of singing males has declined from 22,745 in 1970 to 6,127 currently (Table 7). The largest decline proportionally was the –83% (2,615 birds) in New Jersey but the majority (53%) of the decline was 8,862 singing males in Virginia, where populations declined by 73% during this period.

Habitat Goals

While there is no doubt some breeding south of Virginia, and wintering woodcock in the northern portion of the BCR, the entire Piedmont region has value to migrating woodcock. The northern portions of the Piedmont, that have breeding woodcock surveyed, are the areas that have lost large amounts of early-successional forests. To restore breeding woodcock densities in BCR 29 to levels estimated for 1970 requires that 15,886 singing males be added to current populations in those states covered by the SGS. Manageable acres within those states are estimated at 8,440,600 (Table 8). To reach this population objective will require creating 1,985,750 acres of new woodcock habitat. Currently, there are approximately 1,900,000 acres in early-successional forest stands so the need is to double the amount of acreage in this stage of forest growth.

Table 1. Current and historic (ca. 1971-77) stand-size distribution of timberland in Bird Conservation Region (BCR) 29 and portions of individual states within the BCR.											
	Current stand-size distribution (acres)						Historic stand-size distribution (acres)				
Area	Total forestland[1]	Large diameter[2,3]	Medium diameter[2,4]	Small diameter[2,5]	Non-stocked[2,6]		Total forestland[1]	Large diameter[2,3]	Medium diameter[2,4]	Small diameter[2,5]	Non-stocked[2,6]
Alabama	910,711 (3.5)	221,013 (24.3)	444,697 (48.8)	245,001 (26.9)	0 (0.0)		804,300 (2.9)	202,200 (25.1)	257,400 (32.0)	339,200 (42.2)	5,500 (0.7)
Georgia	6,472,211 (25.1)	2,593,574 (40.1)	1,999,988 (30.9)	1,876,542 (29.0)	2,107 (0.1)		7,205,300 (25.8)	2,632,500 (36.5)	3,036,800 (42.1)	1,467,000 (20.4)	68,500 (1.0)
South Carolina	4,370,527 (17.0)	1,657,286 (37.9)	1,486,532 (34.0)	1,210,237 (27.7)	16,472 (1.0)		4,528,100 (16.2)	1,644,100 (36.3)	1,754,900 (38.8)	1,097,400 (24.2)	30,700 (0.7)
North Carolina	5,915,836 (23.0)	2,694,381 (45.5)	1,370,190 (23.2)	1,840,065 (31.1)	11,200 (0.4)		6,650,800 (23.8)	2,439,400 (36.7)	2,590,400 (38.9)	1,543,000 (23.2)	77,400 (1.2)
Virginia	6,942,601 27.0)	2,791,746 (40.2)	2,514,112 (36.2)	1,615,976 (23.3)	20,767 (0.7)		7,277,700 (26.0)	2,479,100 (34.1)	2,763,700 (38.0)	1,943,500 (26.7)	92,250 (1.3)
Maryland	434,777 (1.7)	377,282 (86.8)	8,158 (1.9)	49,337 (11.3)	0 (0.0)		674,000 (2.4)	470,500 (69.8)	140,800 (20.9)	54,600 (8.1)	8,100 (1.2)
Pennsylvania	518,566 (2.0)	371,990 (71.7)	115,115 (22.2)	22,765 (4.4)	8,696 (2.3)		572,100 (2.0)	400,500 (70.0)	76,000 (13.3)	95,300 (16.7)	0 (0.0)
New Jersey	179,047 (0.7)	90,846 (50.7)	48,892 (27.3)	39,309 (22.0)	0 (0.0)		227,100 (0.8)	94,300 (41.5)	60,000 (26.4)	61,900 (27.3)	10,900 (4.8)
Total BCR	25,744,276 (100.0)	10,798,118 (41.9)	7,987,684 (31.0)	6,899,232 (26.8)	59,242 (0.5)		27,939,400 (100.0)	10,362,600 (37.1)	10,680,000 (38.2)	6,601,900 (23.6)	293,350 (1.1)

[1] Percentages in parentheses. Percentages for total timberland refer to percent of column total.
[2] Percentages for various diameter categories and non-stocked category refer to percent of total forestland for current and historic time periods within each state.
[3] Softwoods at least 9 inches, and hardwoods at least 11 inches in diameter at breast height; size class has more than 50% of stocking in medium and large diameter trees, with stocking of large trees equal to or greater than medium diameter trees.
[4] Trees at least 5 inches in diameter at breast height, but smaller than large diameter; size class has more than 50% of stocking in medium and large diameter trees, with stocking of large trees less than stocking of medium diameter.
[5] Saplings 1-5 inches diameter at breast height, plus softwood seedlings more than 6 inches tall and hardwood seedlings more than 12 inches tall.; size class has at least 50% of stocking in small diameter trees.
[6] Commercial forestland on which stocking of trees is less than 16.7%.

Table 2. Percent composition of forest types between states within BCR 29, 2006.									
Forest Type	AL	GA	SC	NC	VA	MD	PA	NJ	Total
Loblolly pine	6.1	37.5	25.9	12.6	18.0	0.0	0.0	0.0	100
White oak / red oak / hickory	2.1	27.0	14.6	12.7	37.6	1.0	4.1	0.9	100
Mixed upland hardwoods	4.4	15.9	14.5	41.2	21.8	1.7	0.5	0.0	100
Yellow-poplar / white oak / red oak	1.2	6.3	6.8	30.7	51.8	1.3	1.9	0.0	100
Loblolly pine / hardwood	6.3	41.5	14.7	23.7	13.8	0.0	0.0	0.0	100
Sweetgum / yellow-poplar	3.7	32.5	15.8	27.0	18.7	0.0	0.0	2.3	100
Virginia pine	0.0	1.6	11.6	37.9	48.9	0.0	0.0	0.0	100
Virginia pine / southern red oak	0.0	3.5	15.1	32.8	48.4	0.0	0.2	0.0	100
Chestnut oak	0.0	4.1	7.9	26.2	54.1	0.0	7.8	0.0	100
Shortleaf pine / oak	0.4	21.2	29.1	33.6	15.6	0.0	0.0	0.0	100
Shortleaf pine	7.9	19.2	26.6	29.1	17.3	0.0	0.0	0.0	100
Sweetgum / Nuttall oak / willow oak	4.6	56.1	13.3	10.9	15.1	0.0	0.0	0.0	100
River birch / sycamore	0.0	18.8	11.0	24.5	40.8	5.0	0.0	0.0	100
Sugarberry / hackberry / elm / green ash	0.0	18.4	33.9	26.2	17.1	0.0	4.4	0.0	100
White pine / red oak / white ash	0.0	0.0	1.6	44.2	51.3	0.0	3.0	0.0	100
Other pine / hardwood	4.2	4.8	9.9	44.4	36.7	0.0	0.0	0.0	100
White oak	0.0	7.3	23.0	11.4	29.8	23.7	4.8	0.0	100
Sweetbay / swamp tupelo / red maple	2.2	35.1	0.0	34.0	28.7	0.0	0.0	0.0	100
yellow poplar	0.0	1.5	0.0	0.0	0.0	78.8	19.8	0.0	100
Chestnut oak/black oak/scarlet oak	0.0	0.0	0.0	0.0	0.0	56.4	43.6	0.0	100
Post oak / blackjack oak	0.0	48.8	27.9	14.2	9.0	0.0	0.0	0.0	100
Eastern white pine	0.0	4.5	18.9	59.2	16.5	0.0	1.0	0.0	100
Eastern redcedar/hardwood	0.0	3.4	52.3	44.3	0.0	0.0	0.0	0.0	100
Sugar maple/beech/yellow birch	0.0	0.0	0.0	0.0	0.0	0.0	47.8	52.2	100
Eastern redcedar	0.0	0.0	19.8	19.9	54.2	0.0	6.1	0.0	100
Cherry/ash/yellow poplar	0.0	0.0	0.0	0.0	0.0	0.0	43.3	56.7	100
Northern red oak	0.0	0.0	7.1	5.1	19.9	19.2	9.0	39.8	100
Non stocked	0.0	1.9	15.2	10.3	19.1	45.4	8.0	0.0	100
1Other	0.0	35.9	12.8	8.4	10.4	9.9	22.6	0.0	100

[1]Other includes 26 individual forest types, each $\leq$ 0.4% of total forest acreage for BCR.

Table 3. Forest composition of timberland within Bird Conservation Region 29 (acres; percent of column total in parentheses).									
Type	AL	GA	SC	NC	VA	MD	PA	NJ	Total
Loblolly pine	403,006 (44.3)	2,496,694 (38.6)	1,721,095 (39.4)	838,383 (14.2)	1,195,480 (17.2)	0 (0.0)	0 (0.0)	0 (0.0)	6,654,658 (25.8)
White oak / red oak / hickory	68,110 (7.5)	867,132 (13.4)	468,521 (10.7)	408,935 (6.9)	1,210,097 (17.4)	33,447 (7.7)	130,437 (25.2)	29,482 (16.5)	3,216,161 (12.5)
Mixed upland hardwoods	118,763 (13.0)	427,825 (6.6)	391,416 (9.0)	1,112,440 (18.8)	587,593 (8.5)	45,908 (10.6)	14,173 (2.7)	0 (0.0)	2,698,118 (10.5)
Yellow-poplar / white oak / red oak	28,830 (3.2)	155,016 (2.4)	166,677 (3.8)	751,079 (12.7)	1,266,925 (18.2)	31,922 (7.3)	46,120 (8.9)	0 (0.0)	2,446,569 (9.5)
Loblolly pine / hardwood	150,282 (16.5)	984,144 (15.2)	349,037 (8.0)	563,164 (9.5)	327,076 (4.7)	0 (0.0)	0 (0.0)	0 (0.0)	2,373,703 (9.2)
Sweetgum / yellow-poplar	79,065 (8.7)	693,822 (10.7)	337,084 (7.7)	576,418 (9.7)	399,207 (5.8)	0 (0.0)	0 (0.0)	48,892 (27.3)	2,134,488 (8.3)
Virginia pine	0 (0.0)	16,684 (0.3)	117,325 (2.7)	385,000 (6.5)	495,995 (7.1)	0 (0.0)	0 (0.0)	0 (0.0)	1,015,004 (3.9)
Virginia pine / southern red oak	0 (0.0)	24,976 (0.4)	107,787 (2.5)	234,066 (4.0)	345,368 (5.0)	0 (0.0)	1,544 (0.3)	0 (0.0)	713,741 (2.8)
Chestnut oak	0 (0.0)	24,176 (0.4)	46,640 (1.1)	155,418 (2.6)	320,816 (4.6)	0 (0.0)	46,281 (8.9)	0 (0.0)	593,331 (2.3)
Shortleaf pine / oak	2,075 (0.2)	104,019 (1.6)	142,751 (3.3)	164,362 (2.8)	76,566 (1.1)	0 (0.0)	0 (0.0)	0 (0.0)	489,773 (1.9)
Shortleaf pine	33,298 (3.7)	81,226 (1.3)	112,691 (2.6)	123,243 (2.1)	73,243 (1.1)	0 (0.0)	0 (0.0)	0 (0.0)	423,701 (1.6)
Sweetgum / Nuttall oak / willow oak	16,549 (1.8)	202,242 (3.1)	47,998 (1.1)	39,390 (0.7)	54,331 (0.8)	0 (0.0)	0 (0.0)	0 (0.0)	360,510 (1.4)
River birch / sycamore	0 (0.0)	66,138 (1.0)	38,676 (0.9)	86,204 (1.5)	143,647 (2.1)	17,717 (4.1)	0 (0.0)	0 (0.0)	352,382 (1.4)
Sugarberry / hackberry / elm / green ash	0 (0.0)	40,142 (0.6)	74,204 (1.7)	57,283 (1.0)	37,425 (0.5)	0 (0.0)	9,591 (1.8)	0 (0.0)	218,645 (0.8)
White pine / red oak / white ash	0 (0.0)	0 (0.0)	3,263 (0.1)	91,854 (1.6)	106,606 (1.5)	0 (0.0)	6,202 (1.2)	0 (0.0)	207,925 (0.8)
Other pine / hardwood	7,827 (0.9)	8,923 (0.1)	18,281 (0.4)	82,225 (1.4)	67,897 (1.0)	0 (0.0)	0 (0.0)	0 (0.0)	185,153 (0.7)
White oak	0 (0.0)	13,039 (0.2)	40,775 (0.9)	20,229 (0.3)	52,902 (0.8)	42,052 (9.7)	8,445 (1.6)	0 (0.0)	177,442 (0.7)
Sweetbay / swamp tupelo / red maple	2,906 (0.3)	45,887 (0.7)	0 (0.0)	44,423 (0.8)	37,547 (0.5)	0 (0.0)	0 (0.0)	0 (0.0)	130,763 (0.5)
Yellow poplar	0 (0.0)	1,852 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	98,331 (22.6)	24,659 (4.8)	0 (0.0)	124,842 (0.5)
Chestnut oak/black oak/scarlet oak	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	62,862 (14.5)	48,586 (9.4)	0 (0.0)	111,448 (0.4)
Post oak / blackjack oak	0 (0.0)	54,263 (0.8)	31,035 (0.7)	15,774 (0.3)	10,012 (0.1)	0 (0.0)	0 (0.0)	0 (0.0)	111,084 (0.4)
Eastern white pine	0 (0.0)	4,814 (0.1)	20,113 (0.5)	63,004 (1.1)	17,518 (0.3)	0 (0.0)	1,032 (0.2)	0 (0.0)	106,481 (0.4)
Eastern redcedar/hardwood	0 (0.0)	2,947 (0.0)	45,125 (1.0)	38,257 (0.6)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	86,329 (0.3)

Table 3. Forest composition of timberland within Bird Conservation Region 29 (acres; percent of column total in parentheses).									
Type	AL	GA	SC	NC	VA	MD	PA	NJ	Total
Sugar maple/beech/yellow birch	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	35,978 (6.9)	39,309 (22.0)	75,287 (0.3)
Eastern redcedar	0 (0.0)	0 (0.0)	14,497 (0.3)	14,606 (0.2)	39,765 (0.6)	0 (0.0)	4,508 (0.9)	0 (0.0)	73,376 (0.3)
Cherry/ash/yellow poplar	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	30,077 (5.8)	39,309 (22.0)	69,386 (0.3)
Northern red oak	0 (0.0)	0 (0.0)	3,915 (0.1)	2,801 (0.0)	11,033 (0.2)	10,639 (2.4)	4,987 (1.0)	22,055 (12.3)	55,430 (0.2)
Non stocked	0 (0.0)	2,107 (0.0)	16,472 (0.4)	11,200 (0.2)	20,767 (0.3)	49,337 (11.3)	8,696 (1.7)	0 (0.0)	108,579 (0.4)
[1]Other	0 (0.0)	154,145 (2.4)	55,150 (1.3)	36,079 (0.6)	44,783 (0.6)	42,561 (9.8)	97,249 (18.8)	0 (0.0)	429,967 (1.7)

Table 4. Stand size class[1] composition (in thousands of acres) of the most common forest types found in states within BCR 29.

	Forest Type																				
Stand size class	Loblolly Pine	White oak/red oak/hickory	Mixed upland hardwoods	Yellow-poplar/white oak/red oak	Loblolly pine/hardwood	Sweetgum/yellow-poplar	Virginia pine	Virginia pine/southern red oak	Chestnut oak	Shortleaf pine/oak	Shortleaf pine	Sweetgum/nuttall oak/willow oak	River birch/sycamore	Sugarberry/hackberry/elm/ green ash	White pine/red oak/white ash	Other pine/hardwood	White oak	Sweetbay/swamp tupelo/red maple	Yellow poplar	Other[2]	All forest types
AL																					
Large	105.5	26.0	27.5	10.4	17.4	15.0	0.0	0.0	0.0	0.0	7.4	8.7	0.0	0.0	0.0	0.0	0.0	2.9	0.0	26.0	221.0
Medium	197.7	35.6	56.0	8.0	83.1	22.6	0.0	0.0	0.0	0.0	25.9	7.8	0.0	0.0	0.0	7.8	0.0	0.0	0.0	35.6	444.7
Small	99.6	6.5	35.3	10.4	49.7	41.4	0.0	0.0	0.0	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.5	245.0
GA																					
Large	903.6	539.3	89.8	136.4	285.0	216.8	13.3	5.6	0.0	45.1	62.1	101.7	43.2	27.1	0.0	5.9	4.4	13.3	0.0	81.1	2,593.6
Medium	941.8	253.5	89.0	8.7	250.9	165.6	2.6	13.5	4.4	47.5	18.0	69.6	18.2	13.1	0.0	0.0	8.6	22.9	1.8	71.8	2,000.0
Small	651.3	74.3	249.1	9.9	448.3	311.5	0.9	5.9	0.0	11.4	1.0	31.0	4.8	0.0	0.0	3.0	0.0	9.6	0.0	25.3	1,876.5
SC																					
Large	531.7	302.7	82.5	119.1	99.6	132.7	49.4	38.2	32.4	49.1	41.6	25.9	25.6	34.4	0.0	3.5	21.8	0.0	0.0	10.4	1,657.3
Medium	585.3	143.8	135.7	27.7	113.0	94.9	50.3	36.8	14.3	83.6	65.8	8.9	9.2	33.9	3.3	5.4	19.0	0.0	0.0	89.6	1,486.5
Small	604.1	22.0	173.2	19.9	136.4	109.5	17.7	32.8	0.0	10.1	5.3	13.2	3.8	5.9	0.0	9.4	0.0	0.0	0.0	46.9	1,210.2
NC																					
Large	241.2	297.2	395.3	497.0	154.6	268.5	163.4	86.4	102.5	95.5	68.2	15.0	59.7	41.5	60.4	44.9	12.5	8.6	0.0	81.8	2,694.4
Medium	295.3	78.3	254.7	146.3	70.0	114.2	107.9	66.0	43.9	28.5	44.2	5.7	26.5	9.6	26.4	8.4	0.0	8.8	0.0	35.3	1,370.2
Small	301.8	33.4	462.3	107.8	338.5	193.7	113.7	81.7	9.1	40.4	10.8	18.7	0.0	6.1	5.0	28.9	7.7	27.0	0.0	51.7	1,840.1
VA																					
Large	225.1	672.0	150.5	721.2	108.4	114.6	178.5	71.6	178.1	49.6	38.2	16.4	84.9	17.4	38.0	35.1	37.9	18.9	0.0	35.1	2,791.7
Medium	532.1	376.4	268.1	367.2	116.8	115.9	196.8	135.5	132.0	19.3	31.2	26.6	40.6	10.4	49.8	18.5	15.0	5.7	0.0	47.9	2,514.1
Small	438.3	161.6	169.0	178.5	101.8	168.7	120.7	138.3	10.7	7.7	3.8	11.3	18.1	9.6	18.8	14.3	0.0	12.8	0.0	24.8	1,616.0
MD																					
Large	0.0	33.4	37.8	31.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.7	0.0	0.0	0.0	42.1	0.0	98.3	116.1	377.3
Medium	0.0	0.0	8.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.2
Small	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PA																					
Large	0.0	120.5	10.3	33.3	0.0	0.0	0.0	0.0	37.7	0.0	0.0	0.0	0.0	3.4	6.2	0.0	4.6	0.0	13.4	147.5	372.0
Medium	0.0	9.9	3.9	12.8	0.0	0.0	0.0	1.5	8.6	0.0	0.0	0.0	0.0	6.2	0.0	0.0	3.8	0.0	11.3	57.1	115.1
Small	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22.8	22.8
NJ																					
Large	0.0	29.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	61.4	90.9
Medium	0.0	0.0	0.0	0.0	0.0	48.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	48.8
Small	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	39.3	39.3
Total																					

Table 4. Stand size class[1] composition (in thousands of acres) of the most common forest types found in states within BCR 29.

	Forest Type																				
Stand size class	Loblolly Pine	White oak/red oak/hickory	Mixed upland hardwoods	Yellow-poplar/white oak/red oak	Loblolly pine/hardwood	Sweetgum/yellow-poplar	Virginia pine	Virginia pine/southern red oak	Chestnut oak	Shortleaf pine/oak	Shortleaf pine	Sweetgum/nuttall oak/willow oak	River birch/sycamore	Sugarberry/hackberry/elm/green ash	White pine/red oak/white ash	Other pine/hardwood	White oak	Sweetbay/swamp tupelo/red maple	Yellow poplar	Other[2]	All forest types
BCR																					
Large	2,007.1	2,020.6	793.7	1,549.3	665.0	747.6	404.6	201.8	350.7	239.3	217.5	167.7	231.1	123.8	104.6	89.4	123.3	43.7	111.7	559.4	10,798.1
Medium	2552.2	897.5	815.6	570.7	633.8	562.1	357.6	253.3	203.2	178.9	185.1	118.6	94.5	73.2	79.5	40.1	46.4	37.4	13.1	337.3	7987.6
Small	2095.1	297.8	1088.9	326.5	1074.7	824.8	253.0	258.7	19.8	71.7	20.9	74.2	26.7	21.6	23.8	55.6	7.7	49.4	0.0	217.3	6849.9

[1]**Large diameter** trees: hardwoods at least 11 inches diameter, 9 inches for softwoods; size class has more than 50% of stocking in medium and large diameter trees, with stocking of large trees equal to or greater than medium diameter trees. **Medium diameter** trees: trees at least 5 inches diameter but not as large as large diameter trees; size class has more than 50% of sticking in medium and large diameter trees, with stocking of large diameter trees less than stocking of medium trees. **Small diameter** trees: trees less than 5 inches diameter; size class has at least 50% of the stocking in small diameter trees.
[2]Other includes 34 individual forest types, each less than 0.5% of total forest acreage for BCR.

Table 5. Physiographic class composition (in thousands of acres) of the most common forest types found in states within BCR 29.

	Forest Type																				
Physio-Class	Loblolly Pine	White oak/red oak/hickory	Mixed upland hardwoods	Yellow-poplar/white oak/red oak	Loblolly pine/hardwood	Sweetgum/yellow-poplar	Virginia pine	Virginia pine/southern red oak	Chestnut oak	Shortleaf pine/oak	Shortleaf pine	Sweetgum/nuttall oak/willow oak	River birch/sycamore	Sugarberry/hackberry/elm /green ash	White pine/red oak/white ash	Other pine/hardwood	White oak	Sweetbay/swamp tupelo/red maple	Yellow poplar	Other[1]	All forest types
Dry tops	13.3	53.9	32.4	49.9	6.1	0.0	11.0	8.9	126.6	0.0	0.0	0.0	1.5	0.0	0.0	10.9	0.0	0.0	0.0	13.6	328.1
Dry slopes	395.6	1.4	0.0	0.0	0.0	0.0	0.0	0.0	11.2	0.0	6.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.2	420.5
Other xeric	0.0	0.0	12.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.5	22.9
Deep sands	5.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.6
Flatwoods	138.9	79.3	81.2	24.1	43.9	121.5	39.4	25.6	4.1	0.0	0.0	21.1	6.7	0.0	1.5	0.0	4.6	7.8	4.9	121.4	726
Rolling uplands	4,726.5	2,561.1	1,971.8	1,855.8	2,001.9	1,498.3	841.4	636.4	275.3	363.0	319.4	96.1	44.5	16.5	118.3	153.5	89.4	31.0	111.4	559.7	18,271.3
Moist slopes and coves	1.6	151.3	155.1	346.0	0.0	2.7	7.1	7.6	86.1	4.7	0.0	0.0	0.0	0.0	55.9	6.5	42.1	0.0	8.5	1,067.5	1,942.7
Narrow floodplains/ bottomlands	10.8	0.0	75.0	68.2	55.5	177.9	6.1	0.7	0.0	0.0	0.0	97.2	216.8	86.8	0.0	1.2	0.0	34.7	0.0	84.8	915.7
Broad floodplains/ bottomlands	6.6	1.3	5.3	0.3	5.2	13.9	2.3	0.0	0.0	0.0	0.0	26.9	18.8	11.6	0.0	0.0	0.0	4.3	0.0	9.1	105.6
Other mesic	0.0	5.6	0.0	9.1	5.4	7.7	0.0	0.0	0.0	0.0	0.0	4.4	3.3	0.0	10.1	0.0	3.8	0.0	0.0	3.4	52.8
Swamps/bog	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.4	0.0	5.5	13.9
Small drains	398.8	138.2	171.9	76.3	86.6	130.1	47.6	34.1	70.9	54.3	39.0	85.2	16.6	20.2	22.1	4.8	10.4	28.7	0.0	69.2	1,505.0
Beaver ponds	594.0	147.8	114.7	47.9	113.6	136.3	46.3	50.7	9.1	54.6	40.8	15.4	20.1	32.9	0.0	2.3	8.8	7.2	0.0	58.7	1,501.2
Other hydric	1.7	0.0	0.0	0.0	0.0	6.6	0.0	0.0	0.0	0.0	0.0	5.5	10.1	5.7	0.0	0.0	0.0	8.7	0.0	53.0	91.3
Other	364.2	76.3	78.3	35.3	55.5	39.4	13.8	27.3	10.1	13.1	18.4	8.7	13.9	17.5	0.0	6.0	18.4	0.0	0.0	0.0	796.2

[1]Other includes 34 individual forest types, each less than 0.5% of total forest acreage for BCR.

Table 6. Forest Ownership categories in BCR 29 (acres; percent of column total in parentheses).									
Ownership	Total BCR	AL	GA	SC	NC	VA	MD	PA	NJ
National Forest	666,300 (2.5)	0 (0.0)	172,100 (2.6)	329,100 (7.4)	78,700 (1.2)	86,400 (1.2)	0 (0.0)	0 (0.0)	0 (0.0)
Other federal	381,000 (1.4)	1,500 (0.2)	142,400 (2.2)	46,900 (1.0)	55500.0 (0.9)	123,100 (1.7)	11,800 (2.5)	0 (0.0)	0 (0.0)
State/County/Municipal	524,900 (2.0)	11,000 (1.2)	97,600 (1.5)	41,100 (0.9)	81,000 (1.3)	126,800 (1.8)	85,400 (18.0)	43,500 (7.5)	38,500 (86.3)
Private	25,143,100 (94.1)	869,800 (98.6)	6,191,900 (93.8)	4,053,400 (90.7)	6,102,700 (96.6)	6,769,200 (95.3)	376,300 (79.5)	537,400 (92.5)	242,400 (86.3)
All	26,715,000 (100.0)	882,300 (100.0)	6,603,900 (100.0)	4,470,400 (100.0)	6,317,800 (100.0)	7,105,500 (100.0)	473,400 (100.0)	580,800 (100.0)	280,900 (100.0)

Table 7. Calculation of population deficits and habitat goals for American woodcock in Bird Conservation Region 29[1].			
	Historical[2]		Current
Total land area (acres)			
Maryland[3]	2,079,744		2,079,744
New Jersey	1,018,630		1,018,630
Pennsylvania	2,955,731		2,955,731
Virginia	11,416,467		11,416,467
Total	17,470,572		17,470,572
Manageable acres			
Maryland	674,000		473,400
New Jersey	227,100		280,900
Pennsylvania	572,100		580,800
Virginia	7,277,700		7,105,500
Total	8,700,900		8,440,600
Population of singing males			
Maryland[3]	4,158		1,308
New Jersey	5,243		909
Pennsylvania	8,111		2,439
Virginia	20,188		5,499
Total	37,700		10,155
Population deficit (singing males)[4]			
Maryland[3]		2,850	
New Jersey		4,334	
Pennsylvania		5,672	
Virginia		14,689	
Total		27,545	
Habitat goal (acres)[5]			
Maryland		133,950	
New Jersey		203,698	
Pennsylvania		266,584	
Virginia		690,383	
Total		1,294,615	

[1] Alabama, Georgia, North Carolina and South Carolina are not included in the Singing-ground Survey and therefore are not included in calculations for the BCR.

[2] Historical time period refers to ca. 1970-75.

[3] Includes District of Columbia

[4] The population deficit is not simply the current population of singing males minus the historic level. The deficit considers the density of singing males on manageable acres for each time period.

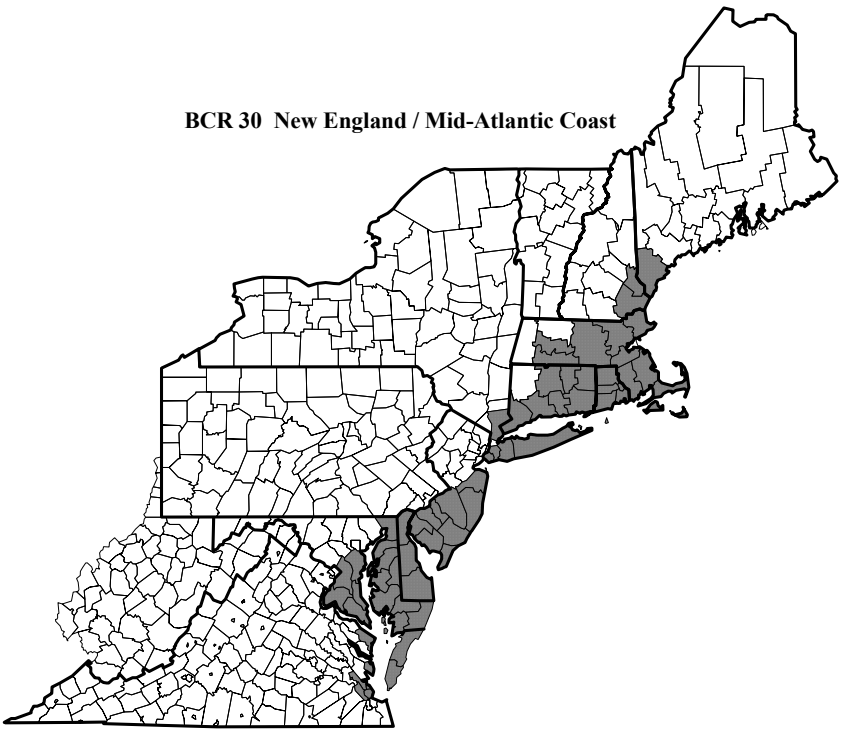
[5] The habitat goal is calculated as the population deficit multiplied by 125 acres.

Bird Conservation Region 30: New England/Mid-Atlantic Coast

Affected states: Maine, New Hampshire, Massachusetts, Rhode Island , Connecticut, New York, New Jersey, Delaware, Maryland, and Virginia

Current area of forest land: 7,655,000 acres (773,800 acres of small diameter and non-stocked forest)

Woodcock trend estimate (% change/year)	1966-2004: - 4.89 1994-2004: - 3.65	Woodcock density estimate (singing males/mi^2)	1970: 1.47 2004: 0.48



Physiography and Habitat Description

BCR 30 occupies the coastal portions of New England and the mid Atlantic states. Counties included within the BCR 30 analysis are York County in southeastern ME, the 2 coastal counties of NH, all of MA and CT east of the Berkshires, RI, the Long Island region of NY, southern NJ, the DelMarva Peninsula region of DE, MD, VA and the counties in MD and VA bordering the Chesapeake Bay. Extensive descriptions of the regions physiography, vegetation and climate can be found in the Dettmers and Rosenberg (2000) and the USDA Forest Service Ecoregion web site (http://www.fs.fed.us/land/pubs/ecoregions).

Forest Composition

Primary forest types in the BCR include northern hardwood, Appalachian oak, and northeastern oak-pine forest. Dominant forest types change on a north to south gradient. The

northern-most portions of the BCR in ME and NH are composed equally of maple/beech/birch, oak/hickory and white/red/jack pine group. Moving south, white/red/jack pine group is no longer a dominant forest type, the maple/beech/birch type declines, and the oak/hickory type increases. The aspen/birch type is nowhere common within the BCR and is absent south of Rhode Island. Portions of the BCR from Long Island in New York south through NJ, DE, MD and VA feature increasing occurrences of the loblolly/shortleaf pine group.

Natural Disturbance Regimes

Fire played an important role in shaping BCR 30 habitats. Key outcomes of fire disturbance include the maintenance of oak-dominated forests and the creation of pitch pine barren habitats. Residential and urban development has curtailed fire as an important ecological factor. Insects and diseases are still an important natural disturbance, especially exotic varieties. Gypsy moth, beech bark disease, chestnut blight, Dutch elm disease and hemlock woolly adelgid, among others, affect forest composition and structure. Disturbance to BCR forests may also be occasionally expected from hurricanes and ice storms.

Cultural History

Native Americans hunted, fished and farmed the land before European settlement in the early 1600's. European settlers accelerated and expanded the cultivation and cutting of BCR forests. By the early 1900s, roughly 70% of the land had been cleared for agriculture or settlement. Farm abandonment resulted in a spike in early successional habitats in the mid 1900s. Since then, urbanization and maturation of forests have resulted in steady declines in availability of woodcock habitat.

Trends in Woodcock Forested Habitats

Comparisons of Forest Inventory Analysis (FIA) data between 1970 and 2005 illustrate the change in the availability of early successional (seedling/sapling) habitats available to woodcock. Seedling/sapling habitats, expressed as a percentage of the forested landscape, have declined from 34% to 10% occurrence in the BCR. All portions of the BCR except those portions in VA and MD have a lower percentage of the forest characterized as seedling/sapling today than in the 1970s (Figure 1). The largest percent losses of seedling/sapling habitat have occurred in the portions of the BCR in NJ (-50%), ME (-45%) and RI (-35%). MA and CT portions have experienced >25% decrease in seedling/sapling habitats.

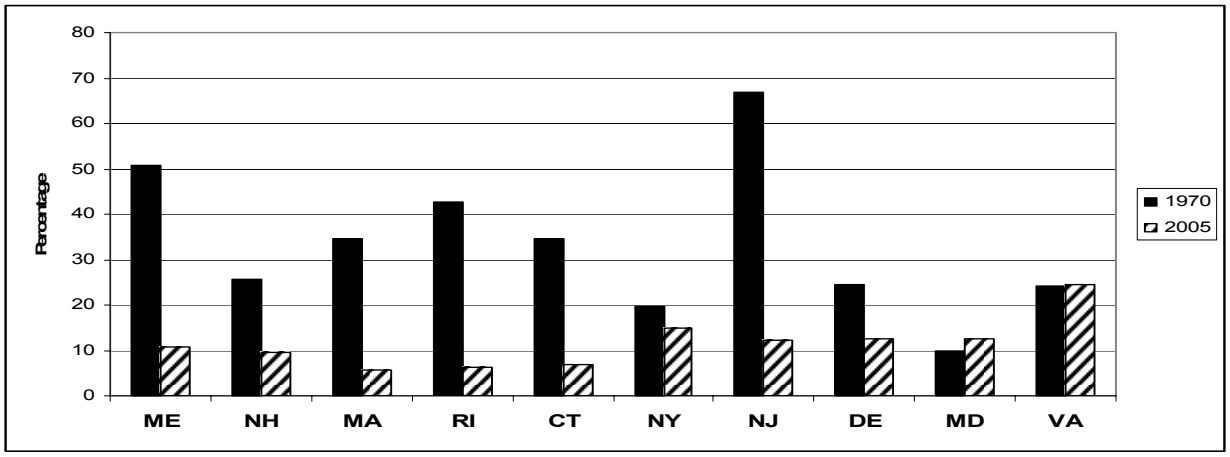


Figure 1. Percent of forested landscapes characterized as seedling/sapling size class in the 1970s and in 2005 for portions of states comprising BCR 30.

Seedling/sapling habitat in the BCR has declined from 2.9 million acres in the 1970s to 0.8 million acres in 2005. The largest decreases in seedling/sapling acreage occurred in those portions of the BCR in NJ (-640,000 acres), MA (-599,000 acres) and CT (-401,000 acres) (Figure 2).

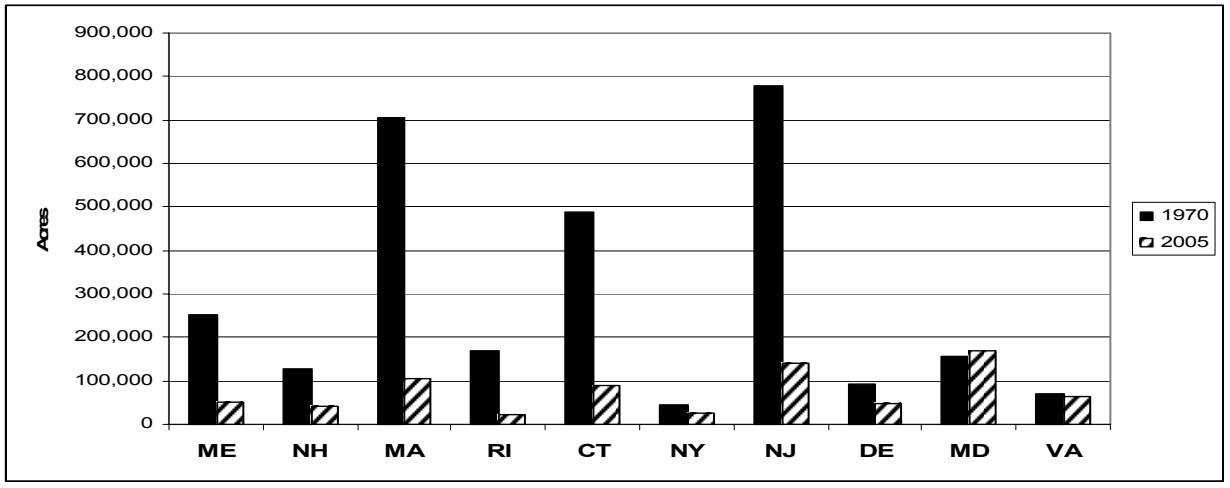


Figure 2. Acreage of seedling/sapling habitats in the 1970s and in 2005 for portions of states comprising BCR 30.

Non-stocked (non-forested) habitat is used by woodcock for roosting and singing grounds. Between the 1970s and 2005, BCR 30 lost 86,500 acres of non-stocked habitat, approximately an 80% decline. Largest losses occurred in portions of the BCR in NJ, MA and MD (Figure 3).

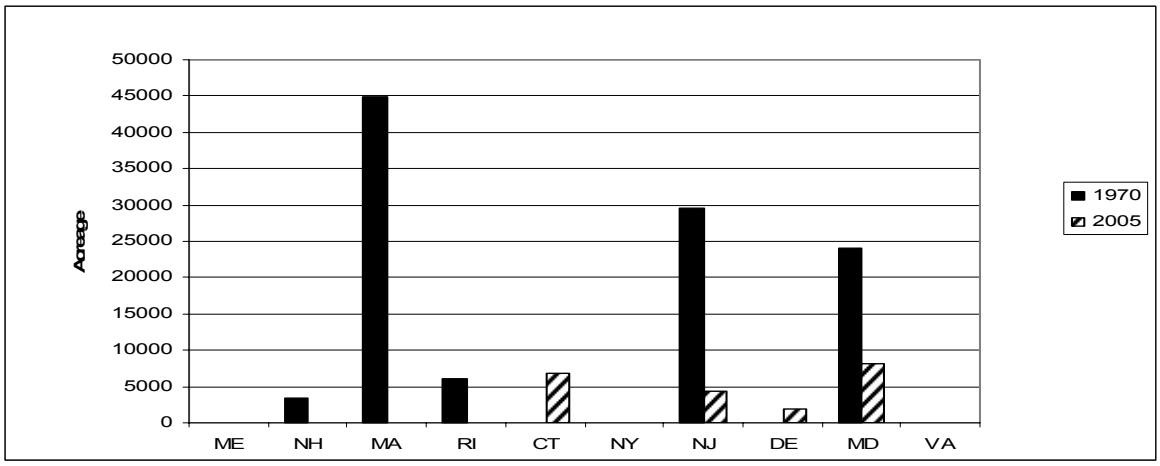


Figure 3. Acreage characterized as non-stocked (non-forested) habitat in the 1970s and in 2005 for portions of states comprising BCR 30.

Trends in Woodcock Wetland Habitats

Comparisons of National Wetland Inventory data illustrate the change in the availability of shrub/scrub (alder) and forested wetlands, both critical components of woodcock habitat. Forested wetlands have declined in the BCR from 1.3 million acres in 1950 to 1 million acres in 1990 (Koenig FWS, personal communication) (Figure 4). Shrub/scrub (alder) wetland acreage in the BCR has declined from 535,000 acres in 1950 to 382,000 acres in 1990 (Koenig FWS, personal communication) (Figure 4). Since the 1950s, BCR 30 has lost 465,000 acres of wetland woodcock habitats, with 225,000 acres lost since the 1970s.

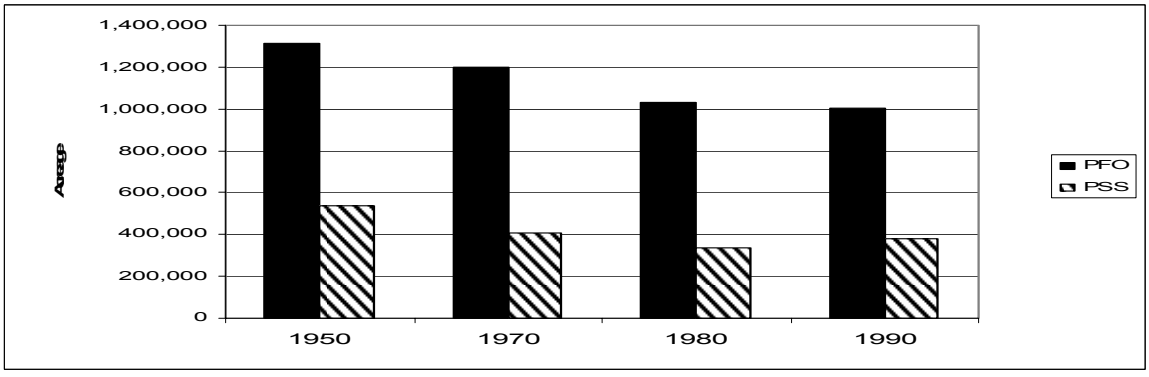


Figure 4. Acreage of forested wetlands (PFO) and shrub/scrub wetlands (PSS) in BCR 30.

Table 1. Current and historic (ca. 1965-80) stand-size distribution of forestland in Bird Conservation Region (BCR) 30 and portions of individual states within the BCR.

	Current stand-size distribution (acres)						Historic stand-size distribution (acres)				
Area	**Total forestland[1]**	**Large diameter[2,3]**	**Medium diameter[2,4]**	**Small diameter[2,5]**	**Non-stocked[2,6]**		**Total forestland[1]**	**Large diameter[2,3]**	**Medium diameter[2,4]**	**Small diameter[2,5]**	**Non-stocked[2,6]**
Maine	487,000 (100.0)	190,600 (39.1)	244,500 (50.2)	51,900 (10.7)	0 (0.0)		498,900 (100.0)	147,600 (29.6)	98,000 (19.6)	253,300 (50.8)	0 (0.0)
New Hampshire	443,100 (100.0)	267,900 (60.5)	133,300 (30.1)	41,900 (9.5)	0 (0.0)		497,300 (100.0)	231,100 (46.5)	135,300 (27.2)	127,500 (25.6)	3,400 (0.7)
Massachusetts	1,822,800 (100.0)	1,171,300 (64.3)	545,700 (29.9)	105,800 (5.8)	0 (0.0)		2,039,900 (100.0)	600,200 (29.4)	689,900 (33.8)	705,000 (34.6)	44,800 (2.2)
Rhode Island	339,700 (100.0)	172,500 (50.8)	145,900 (42.9)	21,300 (6.3)	0 (0.0)		395,300 (100.0)	87,900 (22.2)	133,000 (33.6)	168,300 (42.6)	6,100 (1.5)
Connecticut	1,269,500 (100.0)	842,200 (66.3)	332,400 (26.2)	88,000 (6.9)	6,900 (0.5)		1,406,500 (100.0)	443,000 (31.5)	474,800 (33.8)	488,700 (34.7)	0 (0.0)
New York	174,300 (100.0)	106,100 (60.9)	42,300 (24.3)	25,900 (14.9)	0 (0.0)		226,700 (100.0)	117,400 (51.8)	64,800 (28.6)	44,500 (19.6)	0 (0.0)
New Jersey	1,134,900 (100.0)	431,900 (38.1)	559,500 (49.3)	139,100 (12.3)	4,400 (0.4)		1,161,000 (100.0)	158,500 (13.7)	200,600 (17.3)	777,700 (67.0)	29,500 (2.5)
Delaware	375,600 (100.0)	252,400 (67.2)	74,300 (19.8)	47,000 (12.5)	1,800 (0.5)		384,500 (100.0)	207,100 (53.9)	83,300 (21.7)	94,100 (24.5)	0 (0.0)
Maryland	1,351,800 (100.0)	858,000 (63.5)	316,900 (23.4)	168,700 (12.5)	8,200 (0.5)		1,615,400 (100.0)	1,043,900 (64.6)	390,600 (24.2)	156,900 (9.7)	24,000 (1.5)
Virginia	256,400 (100.0)	134,700 (52.6)	58,800 (22.9)	62,800 (24.5)	0 (0.0)		284,252 (100.0)	119,065 (41.9)	96,332 (33.9)	68,855 (24.2)	0 (0.0)
Total BCR	7,655,000 (100.0)	4,427,500 (57.8)	2,453,700 (22.9)	752,500 (9.8)	21,300 (0.3)		8,509,752 (100.0)	3,155,765 (37.1)	2,366,632 (27.8)	2,884,855 (33.9)	107,800 (1.3)

[1] Percentages in parentheses. Percentages for total forestland refer to percent of column total.
[2] Percentages for various diameter categories and non-stocked category refer to percent of total forestland for current and historic time periods within each state.
[3] Softwoods at least 9 inches, and hardwoods at least 11 inches in diameter at breast height.
[4] Trees at least 5 inches in diameter at breast height, but smaller than large diameter.
[5] Saplings 1-5 inches diameter at breast height, plus softwood seedlings more than 6 inches tall and hardwood seedlings more than 12 inches tall.
[6] Commercial forest land on which stocking of trees is less than 16.7 percent.

Table 2. Current composition (acres) of major forest types in Bird Conservation Region 30 (compiled from USFS 2002).

	CT	DE	MA	MD	ME	NH	NJ	NY	RI	VA	TOTAL
Aspen/Birch Group	18,100 (17.2)	0 (0.0)	29,900 (28.4)	0 (0.0)	32,800 (31.2)	21,500 (20.4)	0 (0.0)	0 (0.0)	2,900 (2.8)	0 (0.0)	105,200
Elm/Ash/Cottonwood Group	117,400 (30.4)	13,300 (3.4)	96,000 (24.8)	58,400 (15.1)	27,500 (7.1)	11,600 (3.0)	39,200 (10.1)	4,600 (1.2)	18,600 (4.8)	200 (0.1)	386,800
Loblolly/Shortleaf Pine group	0 (0.0)	49,400 (6.0)	31,800 (3.9)	266,600 (32.2)	0 (0.0)	0 (0.0)	347,700 (42.2)	27,100 (3.3)	1,000 (4.1)	101,000 (0.0)	824,600
Maple/Beech/Birch Group	339,200 (26.2)	9,400 (0.7)	532,200 (41.2)	21,000 (1.6)	135,600 (10.5)	133,700 (10.3)	26,200 (2.0)	43,100 (3.3)	52,800 (4.1)	0 (0.0)	1,293,200
Nonstocked	6,900 (100.0)	0	0	0	0	0	0	0	0	0	6,900
Oak/Gum/Cypress Group	0	25,500	3,300	124,800	0	0	64,500	0	0	19,700	237,800
Oak/Hickory Group	698,200	240,600	663,600	671,000	110,000	112,300	441,800	87,700	215,200	86,700	3,327,100
Oak/Pine Group	24,000	37,300	188,400	209,900	8,500	50,900	197,600	6,500	20,300	48,800	792,200
Pinyon/Juniper Group	5,900	0	3,300	0	0	0	17,800	5,300	0	0	32,300
Spruce/Fir Group	0	0	0	0	6,200	6,800	0	0	3,700	0	16,700
White/Red/Jack Pine Group	59,800	0	267,900	0	166,300	106,300	0	0	25,300	0	625,600

Ownership Patterns of Woodcock Habitat in BCR 30

The majority (82.2%) of woodcock habitat in BCR 30 occurs on privately owned forestland (Table 3). Non-federal publicly owned forestland accounts for 16.1% (1.2 million acres) of BCR 30. There are no USDA Forest Service holdings in the BCR. Other federal holdings amount to 137,000 acres or 1.2% of the BCR.

Woodcock Harvest and Population Status

Importance of BCR to Woodcock Populations

BCR 30 provides value to regional woodcock populations as breeding, migration and wintering habitats. Singing ground survey results (Sauer and Bortner 1991) reflect a mosaic of varying densities, from 1-4 and 0.1-1.0 woodcock per route. Highest singing ground counts in the BCR are found in MA, CT, NJ, DE and the Delmarva Peninsula. When compared to other BCRs in woodcock breeding range, however, BCR 30 supports a low breeding population.
BCR 30's highest value to woodcock is as a migratory pathway. Woodcock from northern BCRs funnel through BCR 30, with high concentrations found in southern NJ and the Delmarva Peninsula. Cape May, NJ is recognized as a significant migratory concentration area worthy of protection (Owen 1980). Woodcock leaving eastern Maine have been documented to pass Cape May, NJ in 8-18 days (McAuley, USGS, personal communication). Stop-over habitats available as feeding covers are critically important to migrating woodcock.

Woodcock are believed to winter in the southern-most extension of BCR 30 covering extreme southern NJ, the Delmarva Peninsula and portions of VA adjacent to the Chesapeake Bay (Owen 1980). Straw et al. (1994) suggest common to abundant densities of wintering woodcock may be found in the Delmarva Peninsula. Southern NJ and eastern MD and VA are believed to support scattered to common densities of wintering woodcock (Straw et al. 1994). The importance of these wintering habitats compared to habitats in the Gulf Coast states has not been documented, but Krohn and Clark (1977) suggests that South Atlantic states winter the majority of woodcock breeding east of the Appalachians.

Table 3: Forest ownership categories in states located within BCR 30.

Ownership	CT	DE	MA	MD	ME	NH	NJ	NY	RI	VA	Total
Other Fed	6,800	0	35,400	14,300	0	0	48,500	13,100	3,500	15,600	137,200
Private	1,029,200	350,600	1,461,000	1,211,200	479,100	385,200	725,400	155,400	258,900	233,200	6,289,200
State/County/Mun	233,500	25,000	326,600	125,900	7,900	57,800	361,100	5,900	77,300	7,700	1,228,700
USFS	0	0	0	0	0	0	0	0	0	0	0
Total	1,269,500	375,600	1,823,000	1,351,400	487,000	443,000	1,135,000	174,400	339,700	256,500	7,655,100

Harvest and Population Status

Harvest

Woodcock from BCR 30 are well represented in USFWS woodcock wing-collection surveys. High numbers of woodcock wings are submitted by hunters in those portions of the BCR in ME, coastal MA and CT, NY, and southern NJ. Lower numbers are submitted from the tip of the Delmarva Peninsula, northern NJ, NH and eastern MA exclusive of Cape Cod.

Harvest data are not available for counties within the BCR, but statewide averages for those states with the majority of area within the BCR illustrate harvest densities (Kelley 2004). In 2004, CT, MA and NJ each had 1000-1400 woodcock hunters, who hunted from 4000 to 6300 days total, and harvested from 2400-4000 woodcock per state. RI had 100 hunters who hunted 700 days and bagged 100 woodcock. DE had 400 hunters who hunted 1600 days and took 400 woodcock. Extrapolating to the entire BCR is subject to high uncertainty, but an unscientific estimate may be that the BCR supported 4500 woodcock hunters who bagged 12,000 woodcock in 2004.

Population Trends

Singing-ground Survey Trends: The long-term trend in woodcock population suggests decreasing population size, with a decrease of 4.89 percent change per year. Short-term trends suggest the rate of decline is lessening, with a -3.65 percent change per year from1995-2004. At the state level, short-term trends in singing ground surveys (Kelley 2004) suggest that NJ has a statistically significant decreasing woodcock population while all other states in the BCR show a statistically non-significant increasing trend. Long term trends (1968-2004) show all states in the BCR except NH with a statistically significant decreasing trend in woodcock numbers.

Population Estimates: Between the 1970's and 2004, all states have witnessed a substantial decrease in woodcock singing male density. Average density across the BCR has decreased from 1.47 males to 0.48 males, a 67% decrease. New Jersey, New York and Delaware have each witnessed decreases of greater than 75% in singing males. Maine and New Hampshire have experienced declines of less than 35%.

Population Deficits: States within BCR 30 have lost 64,000 singing males between the 1970s and 2004 (Table 5). New Jersey has witnessed the greatest loss in singing males with a reduction of > 17,000. Only New Hampshire has a population deficit of less than 1,500 singing males.

Habitat Goals and Management Recommendations

To restore woodcock to 1970's densities, new habitat will need to be created on 2.6 million acres of BCR forestland (Table 5). The calculation of acres needing to be managed was based upon the 1970 average of 48.2 acres of young forest and shrubland per singing male. No state has enough habitat to support 1970 densities. New Jersey has the largest habitat deficit, with 828,000 acres of new habitat needed in order to return to earlier densities. New York and New Jersey will each have to manage >70% of the forested acres remaining in the state's portion of the BCR to achieve the desired woodcock density. New Hampshire's deficit is the smallest of

BCR 30 states with 37,000 acres of new woodcock habitat needed. In New Hampshire, reaching the density goal will mean improving habitat on 7% of the forested acreage remaining in the state's portion of the BCR. On average, states in the BCR need to manage 31% of their remaining forestland to meet woodcock density goals.

Potential for Habitat Management

Private Land Habitat Management

Given that >80% of BCR 30 is privately owned forestland, the potential for the BCR to provide habitat for woodcock will largely depend upon the actions of private landowners. Critical assessments of the potential of private land management for woodcock include:

1. Are landowners informed?
2. Are there sources of technical assistance available to landowners?
3. Are there financial incentives available to motivate landowners to manage woodcock habitat?
4. Are there markets for commercial timber products produced through woodcock habitat management?

Existing programs at the state and federal level are attempting to provide landowners with the technical assistance and funding to improve woodcock habitat. The Ruffed Grouse Society Coverts program is active in NH, CT, MA, MD, NY and VA. The Natural Resources Conservation Service provides cost-share assistance to private landowners through their Wildlife Habitat Improvement Project (WHIP) funds. The US Fish and Wildlife Service's Partners for Fish and Wildlife Program has prioritized early successional habitat.

A new initiative begun by the Wildlife Management Institute in 2005 has organized technical assistance, outreach and funding opportunities for woodcock and other early successional habitat species under one initiative. Twenty-three partners have agreed to cooperative on the objective of the initiative which is to implement the Woodcock Conservation Plan in New England and New York. The Initiative's approach is to develop demonstration areas on suitable public lands to showcase exemplary habitat management for woodcock, provide extensive outreach to private landowners in the vicinity of the demonstration area, and provide technical assistance and funding to private landowners interested in managing their lands for woodcock.

Federal Lands Habitat Management

Critically important migratory stop-over habitat is available on Cape May and Eastern Shore of Virginia National Wildlife Refuges in NJ and VA. Both refuges have prioritized habitat management and protection for migratory birds.

Table 5: Trends in forest cover and woodcock populations and habitat management goals for BCR 30.

	Historical		Current
Total land area (acres)			
Connecticut	2,943,206		2,943,206
Delaware	1,593,139		1,593,139
Massachusetts	5,685,485		5,685,485
Maryland	4,910,202		4,910,202
Maine	813,658		813,658
New Hampshire	753,837		753,837
New Jersey	3,553,677		3,553,677
New York	2,428,870		2,428,870
Rhode Island	988,826		988,826
Virginia	2,043,040		2,043,040
Total	25,713,939		25,713,939
Manageable acres			
Connecticut	1,406,500		1,269,500
Delaware	384,500		375,500
Maine	498,900		487,000
Maryland	1,615,400		1,351,800
Massachusetts	2,039,900		1,822,800
New Hampshire	497,300		443,100
New Jersey	1,161,000		1,134,900
New York	226,700		174,300
Rhode Island	395,300		339,700
Virginia	284,252		256,300
Total	8,509,752		7,654,900
Population of singing males			
Connecticut	10,258		3,387
Delaware	5,198		1,377
Maine	6,004		3,904
Maryland	13,423		3,737
Massachusetts	24,198		12,086
New Hampshire	4,319		3,089
New Jersey	20,645		2,983
New York	7,906		2,706
Rhode Island	3,764		1,301
Virginia	3,978		1,079
Total	99,691		35,650
Population deficit (singing males)			
Connecticut		5,872	
Delaware		3,699	
Maine		1,956	
Maryland		7,496	
Massachusetts		9,536	
New Hampshire		759	
New Jersey		17,198	
New York		3,372	
Rhode Island		1,934	

Virginia		2,507	
Total		54,329	
Habitat goals (acres)			
Connecticut		283,020	
Delaware		178,287	
Maine		94,299	
Maryland		361,291	
Massachusetts		459,628	
New Hampshire		36,597	
New Jersey		828,948	
New York		162,533	
Rhode Island		93,204	
Virginia		120,858	
Total		2,618,665	

The Rachel Carson National Wildlife Refuge (ME) was established to preserve ten important estuaries that are key points along migration routes of waterfowl and other migratory birds. Refuge lands total approximately 4,700 acres in ten geographic units from Kittery to Cape Elizabeth, Maine. In 1989, the refuge boundary expanded to include salt marsh, freshwater wetlands and "critical edge" uplands around each of the nine divisions. In addition, the Biddeford Pool Division, the tenth division of the refuge, was created. This division serves as a key staging area in southern Maine for a large number and diversity of shorebirds. When it is completed, the refuge will be about 7,600 acres in size.

The Parker River NWR (MA) consists of 4,662 acres (1,883 hectares) of diverse upland and wetland habitats including sandy beach and dune, shrub/thicket, bog, swamp, freshwater marsh, salt marsh and associated creek, river, mud flat, and salt panne. These and other refuge habitats support varied and abundant populations of resident and migratory wildlife including more than 300 species of birds and additional species of mammals, reptiles, amphibians, insects, and plants. Portions of refuge lands are mowed to maintain open habitats, providing food and cover for such migratory bird species as American woodcock and bobolink.

The Eastern Massachusetts NWR Complex includes 8 refuges, some of which provide habitat for woodcock. Three Comprehensive Conservation Plans (CCP) have been developed to date that detail status and management opportunities for woodcock. The Assabet River NWR (2,230) identifies woodcock as a breeding resident and outlines management direction for woodcock habitats. Great Meadows NWR (3,863 acres) provides a mix of wetland, upland field, scrub-shrub and forested habitats, and lists woodcock as a resident. Oxbow NWR (1,667 acres) includes wetland and forested habitats along the Nashua River and lists woodcock as a resident.

Chesapeake Marshlands National Wildlife Refuge Complex is strategically located as an important stop-over habitat for migrating woodcock, but refuge management is more heavily focused on forest interior dwelling Neotropical migrant than on species requiring young forest and shrublands. Adjacent private forestland and state wildlife management areas may be managed more to woodcock benefit.

Great Bay NWR provides opportunities for woodcock management.

Silvio Conte NWR provides important technical assistance to private landowners in BCR 30 as well as management opportunities for woodcock on refuge lands.

Department of Defense

Camp Edwards Military Reservation (MA) is strategically located and a large aggregation of potential woodcock habitat.

State Land Habitat Management

Each state in the BCR has numerous opportunities for woodcock management on state wildlife management areas, state parks and state forests.

Status of American Woodcock in Other Planning Efforts and Assessments

The measured decline of American Woodcock has prompted various planning and assessment efforts to highlight the importance of conservation actions dedicated to the improvement of woodcock habitat quality and quantity.

The Atlantic Coast Joint Venture, New Jersey Division of Fish and Wildlife and the International Association of Fish and Wildlife Agencies hosted a workshop for the Southern New England/Mid-Atlantic Bird Conservation Region (BCR 30) December 7-9, 2004 in Cape May, New Jersey. This workshop brought together 85 state, federal and non-governmental organization partners from ten states to review and reach consensus on the highest priorities for bird conservation in BCR 30, the region encompassing the coastal plain from southern Maine to northern Virginia. Using information from the major continental and regional bird conservation plans as well as the draft State Comprehensive Wildlife Conservation Strategies and refuge plans, partners reached consensus on priority bird species, habitat-species suites, threats to these species and habitats, focus areas, and priority conservation actions (habitat and non-habitat conservation projects as well as monitoring, research and outreach projects). American Woodcock were identified as belonging to the group requiring the highest level of conservation concern.

The Partners in Flight Bird Conservation Plan for Southern New England (Physiographic Area 09) (Dettmers and Rosenberg 2000) covers the approximate area covered by BCR 30. American Woodcock are listed as a high priority species representing the early successional scrub/pitch pine barrens habitat type.

The United States Shorebird Conservation Plan (Brown et al 2000) presents the conclusions and recommendations of regional technical working groups who assessed the current status, conservation threats and opportunities and population goals for shorebirds. The North Atlantic Shorebird Working Group (Niles and Clark 2000) identified American Woodcock as a high priority species.

Congress created the State Wildlife Grants Program to provide funding to every state and territory to support cost effective conservation aimed at keeping wildlife from becoming endangered. In order to receive federal funds through the State Wildlife Grants program, Congress charged each state and territory with developing a state Wildlife Action Plan. These strategies will outline species and habitat priorities and the actions that need to be taken to conserve them. American Woodcock had been included on the Species of Greatest Conservation Concern lists for all states in BCR 30.

The Northeast Association of Fish and Wildlife Agencies published a list of Wildlife of Regional Conservation Concern in the Northeast (Therres 1999) and included American Woodcock.

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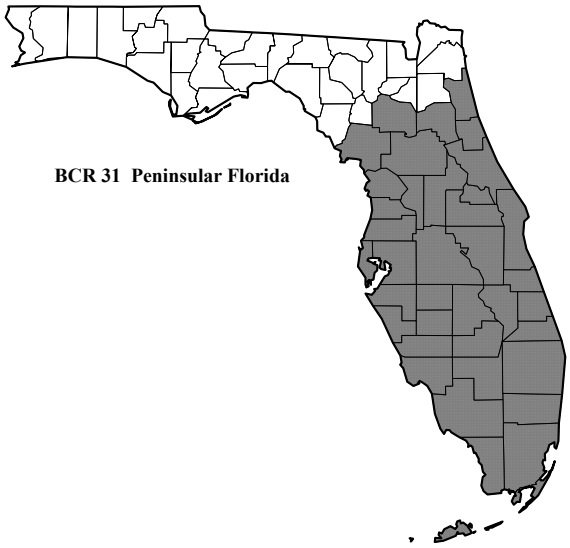
Bird Conservation Region 31: Peninsular Florida

Affected states: Florida

Current area of forest land: 5,180,338 acres (1,714,745 acres of small diameter and non-stocked forest)



Physical Description of BCR 31

BCR 31 occupies the portions of peninsular Florida south of Dixie, Gilchrest, Columbia, Union, Bradford, Duval and Clay counties. Woodcock are believed to be year-around residents in the northern half of BCR 31 and non-breeding residents in the southern half (Keppie and Whiting 1994). Primary forest types in the BCR include slash pine, bald cypress/water tupelo and mixed upland hardwoods (Table 1). Twenty-one forest types are present in the BCR, but 15 types occur on less than 5% of the forested acreage in the BCR (Table 1). Fire has shaped the representation of many types, especially on xeric uplands. Hurricanes are the only dominant natural disturbance factor. Wetlands are locally common to abundant (PIF Physiographic Region 2 Plan) and wet flatwoods, floodplain bottomland hardwood forests may be especially important to woodcock.

Table 1. Current composition (acres) of major forest types in Bird Conservation Region 31 (compiled from USFS 2002).

Forest Type	Acres	Percent
Slash pine	1,412,880	27.3
Baldcypress / water tupelo	656,292	12.7
Mixed upland hardwoods	566,745	10.9
Sweetbay / swamp tupelo / red maple	438,875	8.5
Sand pine	297,338	5.7
Southern scrub oak	284,414	5.5
Slash pine / hardwood	227,849	4.4
Longleaf pine	224,374	4.3
Sable palm	210,077	4.1
Sweetgum / Nuttall oak / willow oak	183,615	3.5
Loblolly pine	141,420	2.7
Longleaf pine / oak	140,147	2.7
Sugarberry / hackberry / elm / green ash	104,416	2.0
Other pine / hardwood	101,264	2.0
Loblolly pine / hardwood	60,456	1.2
Pond pine	55,544	1.1
Sweetgum / yellow-poplar	40,283	0.8
White oak / red oak / hickory	13,583	0.3
Willow	10,170	0.2
Eastern redcedar / hardwood	7,687	0.1
Sycamore / pecan / American elm	2,909	0.1
Total	5,180,338	100

Trends in Woodcock Forested Habitats

Comparisons of Forest Inventory Analysis (FIA) data between 1970 and 2002 illustrate the change in the availability of early successional (seedling/sapling) habitats available to woodcock. Seedling/sapling habitats, expressed as a percentage of the forested landscape, have declined from 29% to 22% occurrence in the BCR (Table 2). Non-stocked forestlands, which may represent certain seasonally important types of woodcock habitat, have declined from 22% occurrence to less than 4% occurrence. In the 30 years between the surveys, BCR 31 has also lost over 1 million acres of forestland.

Table 2. Area of timberland (acres) by stand-size class in Bird Conservation Region (BCR) 31, for current and historic (ca. 1970-75) time periods (Miles 2004).

Year	Large diameter	Medium diameter	Small diameter	Nonstocked	Total Stand-size class
1970	2,003,800	1,554,200	1,380,200	1,356,200	6,294,400
	(31.8%)	(24.7%)	(21.9%)	(21.5%)	
2002	2,105,058	1,360,535	1,517,705	197,040	5,180,338
	(40.6%)	(26.3%)	(29.3%)	(3.8%)	

[1] Percentages in parentheses. Percentages for total forestland refer to percent of column total.
[2] Percentages for various diameter categories and non-stocked category refer to percent of total forestland for current and historic time periods within each state.
[3] Softwoods at least 9 inches, and hardwoods at least 11 inches in diameter at breast height.
[4] Trees at least 5 inches in diameter at breast height, but smaller than large diameter.
[5] Saplings 1-5 inches diameter at breast height, plus softwood seedlings more than 6 inches tall and hardwood seedlings more than 12 inches tall.
[6] Commercial forest land on which stocking of trees is less than 16.7 percent.

Trends in Woodcock Wetland Habitats

Comparisons of National Wetland Inventory data illustrate the change in the availability of shrub/scrub (alder) and forested wetlands, both critical components of woodcock habitat. Forested wetlands have declined in the BCR from 4.5 million acres in 1950 to 2.9 million acres in 1990 (Koenig FWS, personal communication) (Figure 1). Shrub/scrub wetland acreage in the BCR has declined from 2.7 million acres in 1950 to 2.5 million acres in 1990 (Koenig FWS, personal communication) (Figure 4). Since the 1950s, BCR 31 has lost 1.8 million acres of wetland woodcock habitats.

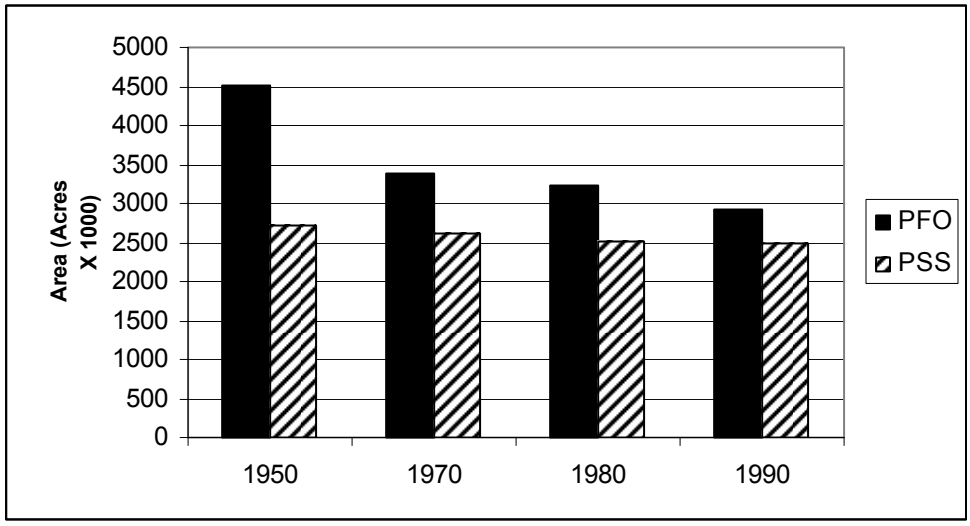


Figure 1. Acreage of forested wetlands (PFO) and shrub/scrub wetlands (PSS) in BCR 31.

Ownership Patterns of Woodcock Habitat in BCR 31

The majority (80.5%) of woodcock habitat in BCR 31 occurs on privately owned forestland (Table 3). Non-federal publicly owned forestland accounts for 10.5% (543,000 acres) of BCR 31. National Forest holdings total 335,000 acres (6.5%).

Table 3. Area of timberland (acres) by ownership classes in Bird Conservation Region 31 (Miles 2004).

Ownership	Total BCR	Percent
National Forest	334,930	6.5
National Park Service	0	0.0
U.S. Fish and Wildlife Service	0	0.0
Dept. of Defense	0	0.0
Other Federal	75,870	1.5
State	543,649	10.5
County/Municipal	57,115	1.1
Other Local Government	0	0.0
Private	4,168,774	80.7
All ownerships	5,180,338	100.0

Status of American Woodcock in Other Planning Efforts and Assessments

The Florida Wildlife Action Plan does not list American woodcock as a species of greatest conservation need in BCR 31.

Harvest

Woodcock from BCR 31 are lightly represented in USFWS woodcock wing receipt studies. Approximately half of the counties in the BCR are not represented by woodcock wing receipts from 1963-2001. Thirteen counties account for 1-101 wing receipts and 5 counties account for 101-501 wing receipts.

Harvest data are not available for counties within the BCR, but statewide averages for those states with the majority of area within the BCR illustrate harvest densities (Kelley and Rau 2005). In 2005, Florida accounted for 1,100 woodcock harvested by 1,000 hunters.

Population Trends

Florida is not within the woodcock singing ground survey area.

Importance of BCR to Woodcock Populations

BCR 31 provides limited value to regional woodcock populations as breeding, migration and wintering habitats. Keppie and Whiting (1994) show woodcock year-around and wintering habitat covering the BCR. Kelley and Rau (2005) show woodcock breeding range ending north of BCR 31. Harvest rates are generally low.

Web citation: Miles, Patrick D. Aug-18-2004. Forest inventory mapmaker web-application version 1.7. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Research Station. [Available only on internet: www.ncrs2.fs.fed.us/4801/fiadb/index.htm]

Kelley, J.R., Jr., and R. D. Rau. 2005. American woodcock population status, 2005. U.S. Fish and Wildlife Service, Laurel, Maryland. 15pp.

Keppie, D. M. and R. M. Whiting, Jr. 1994. American Woodcock (Scolopax minor). In The Birds of North America, No. 100 (A. Poole and F. Gill, Eds.). Philadelphia: The Academy of Natural Sciences; Washington, D.C.: The American Ornithologists' Union.

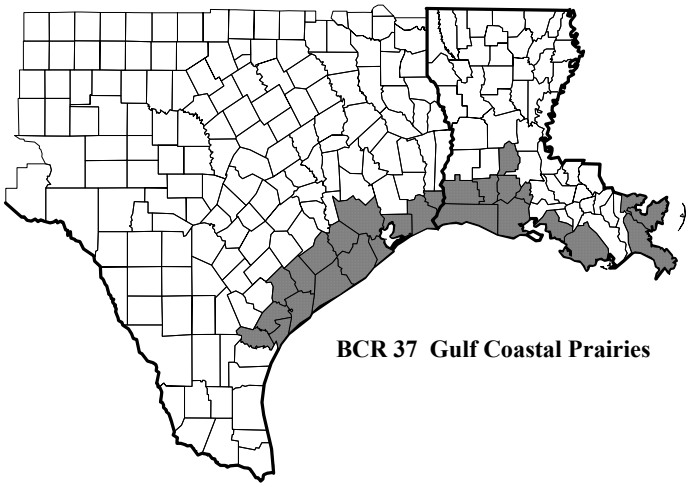
Bird Conservation Region 37: Gulf Coastal Prairie

Affected states: Texas and Louisiana

Current area of forest land: 1,470,799 acres (324,604 acres of small diameter and non-stocked forest)

Woodcock trend estimate – not applicable (% change/year)

Woodcock density estimate – not applicable (singing males/mi^2)



Physiography and Habitat Description

Historical forest inventory data for this BCR is lacking, thus preventing estimation of habitat trends. Early succesional habitat occupies approximately 22% of the timberland in this BCR (Table 1). Major forest types include loblolly pine (19%), baldcypress/water tupelo (15%), loblolly pine/hardwood (12%), sweetgum/Nuttall oak/willow oak (10%), and sugarberry/hackberry/elm/green ash (8%%; Tables 2-4). Flatwoods are the dominant (62%) physiographic class on which major forest types within the region are found, with broad floodplains/bottomlands and swamp/bogs also holding large acreages (Table 5). Approximately 93% of the 1.4 million acres of timberland in the region is under private ownership, whereas State or county forests comprise approximately 5% of all timberland (Table 6).

Woodcock Harvest and Population Status

Although woodcock breed in BCR 37, the region is also an important woodcock wintering area for the Central Region population. Estimates from the Harvest Information Program indicate that 5,500 hunters in Louisiana harvested 18,100 birds throughout the state in 2005 (Kelley and Rau 2006). HIP estimates for woodcock hunters in Texas ranged from 5,900 to 6,200 hunters in 2004 and 2005. However, harvest estimates for the state have been low (0 to 800 birds; Kelley and Rau 2005, 2006).

Population and Habitat Goals

This BCR is not covered by the Singing-ground Survey and therefore no population trends or estimates are available.

Keppie and Whiting (1994) indicated that diurnal habitat use by woodcock includes a variety of forest types, including bottomland hardwoods and mature longleaf pine (especially if recently burned). Preferred vegetation structure varies from dense regenerating stands to open sawtimber stands with distinct understory. Nocturnal habitat use is similar to

northern portions of the species range (open pastures, agricultural fields, etc.). Prescribed burning in pinelands may benefit woodcock by removing pine needles and clearing the forest floor to provide easier access to earthworms (Krementz and Jackson 1999). Where possible, loblolly pine stands should be managed to include a greater hardwood component (see BCR 25 Action Plan). Woodcock management in this BCR should emphasize maintenance of early successional habitat for locally-breeding birds, as well as for wintering migrants.

Table 1. Current stand-size distribution of timberland in Bird Conservation Region (BCR) 37 and portions of individual states within the BCR.

	Current stand-size distribution (acres)				
Area	Total timberland[1]	Large diameter[2,3]	Medium diameter[2,4]	Small diameter[2,5]	Non-stocked[2,6]
Louisiana	1,039,713 (70.7)	546,315 (52.5)	306,504 (29.5)	186,894 (18.0)	0 (0.0)
Texas	431,086 (29.3)	202,339 (46.9)	91,056 (21.1)	131,169 (31.6)	1,523 (0.4)
Total BCR	1,470,799 (100.0)	748,707 (50.9)	397,588 (27.0)	323,081 (22.0)	1,523 (0.1)

Table 2. Percent composition of forest types between states within BCR 23.

Forest Type	LA	TX	Total
Baldcypress / water tupelo	87.8	12.2	100.0
Loblolly pine	54.6	45.4	100.0
Sugarberry / hackberry / elm / green ash	92.8	7.2	100.0
Loblolly pine / hardwood	62.6	37.4	100.0
Sweetgum / Nuttall oak / willow oak	69.3	30.7	100.0
Slash pine	87.9	12.1	100.0
Willow	100.0	0.0	100.0
Other exotic hardwoods	35.9	64.1	100.0
Mixed upland hardwoods	38.1	61.9	100.0
Longleaf pine	100.0	0.0	100.0
Sweetbay / swamp tupelo / red maple	84.2	15.8	100.0
Swamp chestnut oak / cherrybark oak	77.3	22.7	100.0
Cottonwood / willow	100.0	0.0	100.0
White oak / red oak / hickory	76.2	23.8	100.0
Sycamore / pecan / American elm	74.5	25.5	100.0
Longleaf pine / oak	100.0	0.0	100.0
Sweetgum / yellow-poplar	100.0	0.0	100.0
Overcup oak / water hickory	100.0	0.0	100.0
Total	87.8	12.2	100.0

Table 3. Forest composition of timberland within Bird Conservation Region 37 (acres; percent of column total in parentheses).			
Forest Type	MN	WI	Total
Baldcypress / water tupelo	192,676 (18.5)	269,802 (6.2)	219,478 (14.9)
Loblolly pine	155,077 (14.9)	129,082 (29.9)	284,159 (19.3)
Sugarberry / hackberry / elm / green ash	115,525 (11.1)	8,976 (2.1)	124,501 (8.5)
Loblolly pine / hardwood	109,501 (10.5)	65,463 (15.2)	174,964 (11.9)
Sweetgum / Nuttall oak / willow oak	97,719 (9.4)	43,219 (10.0)	140,938 (9.6)
Slash pine	80,907 (7.8)	11,154 (2.6)	92,061 (6.3)
Willow	45,963 (4.4)	0 (0.0)	45,963 (3.1)
Other exotic hardwoods	37,209 (3.6)	66,581 (15.4)	103,790 (7.1)
Mixed upland hardwoods	34,057 (3.3)	55,441 (12.9)	89,498 (6.1)
Longleaf pine	33,633 (3.2)	0 (0.0)	33,663 (2.3)
Sweetbay / swamp tupelo / red maple	26,549 (2.6)	4,995 (1.2)	31,544 (2.1)
Swamp chestnut oak / cherrybark oak	24,848 (2.4)	7,285 (1.7)	32,133 (2.2)
Cottonwood / willow	22,378 (2.2)	0 (0.0)	22,378 (1.5)
White oak / red oak / hickory	19,468 (1.9)	6,069 (1.4)	25,537 (1.7)
Sycamore / pecan / American elm	13,275 (1.3)	4,551 (1.1)	17,826 (1.2)
Longleaf pine / oak	12,692 (1.2)	0 (0.0)	12,692 (0.9)
Sweetgum / yellow-poplar	9,103 (0.9)	0 (0.0)	9,103 (0.6)
Overcup oak / water hickory	9,103 (0.9)	0 (0.0)	9,103 (0.6)
Total	1,039,713 (100.0)	431,135 (100.0)	1,470,848 (100.0)

Table 4. Stand size class[1] composition (in thousands of acres) of the most common forest types found in states within BCR 37.

	Forest Type																		
Stand size class	Baldcypress / water tupelo	Loblolly pine	Sugarberry / hackberry / elm / green ash	Loblolly pine / hardwood	Sweetgum / Nuttall oak / willow oak	Slash pine	Willow	Other exotic hardwoods	Mixed upland hardwoods	Longleaf pine	Sweetbay / swamp tupelo / red maple	Swamp chestnut oak / cherrybark oak	Cottonwood / willow	White oak / red oak / hickory	Sycamore / pecan / American elm	Longleaf pine / oak	Sweetgum / yellow-poplar	Overcup oak / water hickory	All forest type
Louisiana																			
Large	134.5	60.7	39.8	57.3	80.9	43.0	0.0	0.0	13.8	20.7	13.3	24.8	13.3	9.1	13.3	12.7	0.0	9.1	546.3
Medium	38.8	49.1	69.0	44.4	16.8	20.7	23.0	12.2	8.9	10.4	13.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	306.5
Small	19.4	45.3	6.7	7.8	0.0	17.1	23.0	25.0	11.4	2.6	0.0	0.0	9.1	10.4	0.0	0.0	9.1	0.0	186.9
Texas																			
Large	15.7	87.0	0.0	33.4	30.2	0.0	0.0	3.0	15.4	0.0	0.0	6.1	0.0	6.1	4.6	0.0	0.0	0.0	201.4
Medium	5.6	20.6	9.0	14.4	13.1	0.0	0.0	22.1	7.6	0.0	5.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	98.4
Small	5.6	21.5	0.0	17.7	0.0	11.2	0.0	41.5	32.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	129.8
Total BCR																			
Large	150.2	147.7	39.8	90.7	111.1	43.0	0.0	3.0	29.2	20.7	13.3	30.9	13.3	15.2	17.8	12.7	0.0	9.1	747.7
Medium	44.4	69.6	78.0	58.8	29.9	20.7	23.0	34.3	16.5	10.4	18.3	1.2	0.0	0.0	0.0	0.0	0.0	0.0	404.9
Small	25.0	66.8	6.7	25.5	0.0	28.3	23.0	66.5	43.8	2.6	0.0	0.0	9.1	10.4	0.0	0.0	9.1	0.0	316.7

Table 5. Physiographic class composition (in thousands of acres) of the most common forest types found in states within BCR 23.

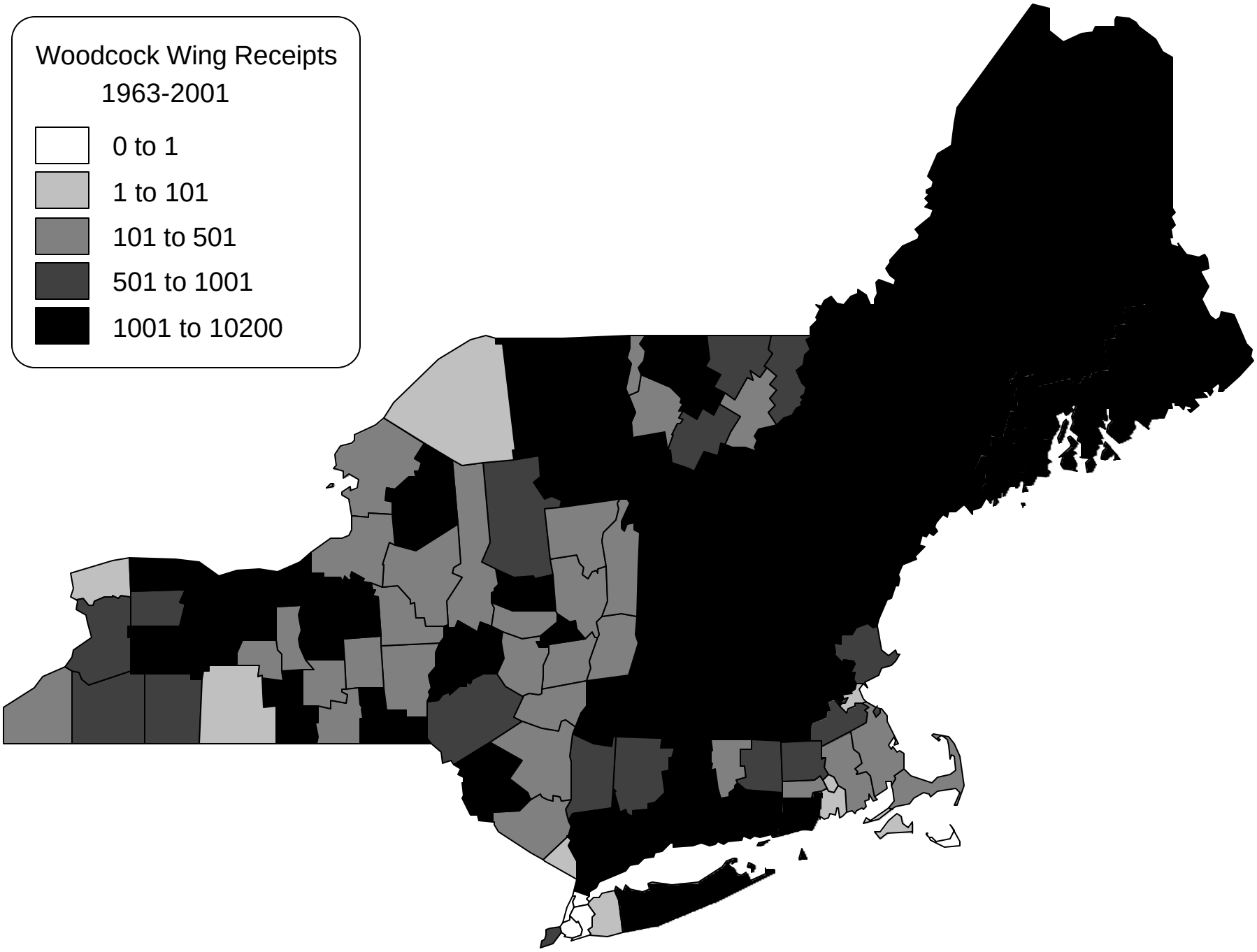
	Forest Types																	
Physio-graphic class	Baldcypress / water tupelo	Loblolly pine	Sugarberry / hackberry / elm / green ash	Loblolly pine / hardwood	Sweetgum / Nuttall oak / willow oak	Slash pine	Willow	Other exotic hardwoods	Mixed upland hardwoods	Longleaf pine	Sweetbay / swamp tupelo / red maple	Swamp chestnut oak / cherrybark oak	Cottonwood / willow	White oak / red oak / hickory	Sycamore / pecan / American elm	Longleaf pine / oak	Sweetgum / yellow-poplar	Overcup oak / water hickory	All forest type
Flatwoods	4.6	249.7	82.4	126.2	110.6	62.9	0.0	91.5	72.3	31.1	18.3	23.7	0.0	16.4	0.0	12.7	9.1	0.0	912.8
Rolling uplands	0.0	18.1	19.5	9.7	8.2	20.3	0.0	0.0	5.6	2.6	0.0	0.0	0.0	9.1	0.0	0.0	0.0	0.0	92.9
Narrow floodplains/bottomlands	0.0	16.4	10.4	6.1	11.1	0.0	0.0	12.3	6.1	0.0	0.0	8.5	9.1	0.0	0.0	0.0	0.0	0.0	79.9
Broad floodplains/bottomlands	45.5	0.0	12.3	33.0	11.0	8.9	23.0	0.0	5.6	0.0	0.0	0.0	13.3	0.0	17.8	0.0	0.0	9.1	179.5
Swamps/bogs	163.9	0.0	0.0	0.0	0.0	0.0	9.7	0.0	0.0	0.0	13.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	186.9
Small drains	5.6	0.0	0.0	0.0	0.0	0.0	13.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.8
Total	219.5	284.2	124.5	175.0	140.9	92.1	46.0	103.8	89.5	33.7	31.5	32.1	22.4	25.5	17.8	12.7	9.1	9.1	1,470.8

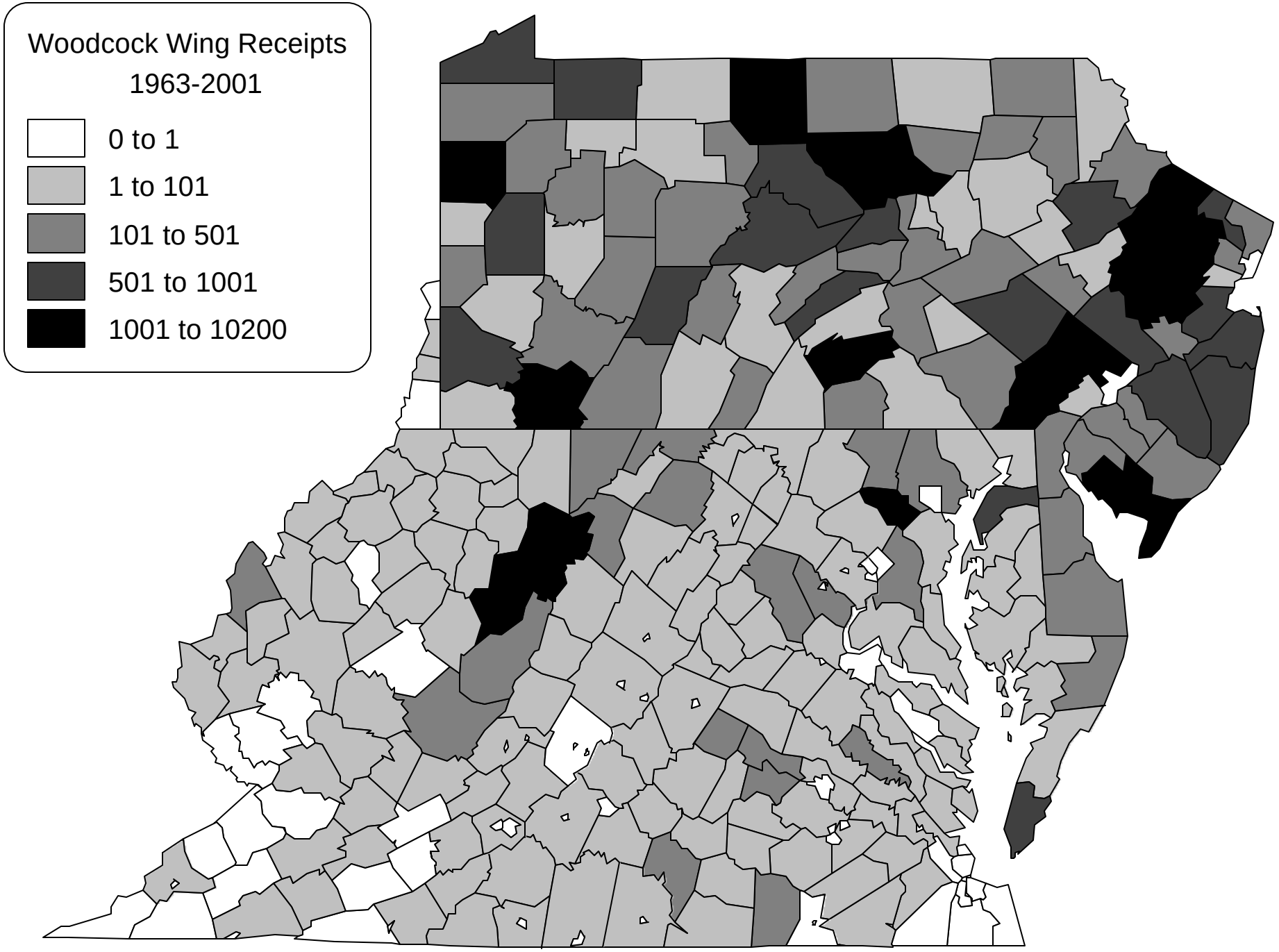
Table 6. Forest ownership categories in Bird Conservation Region 37 (acres).

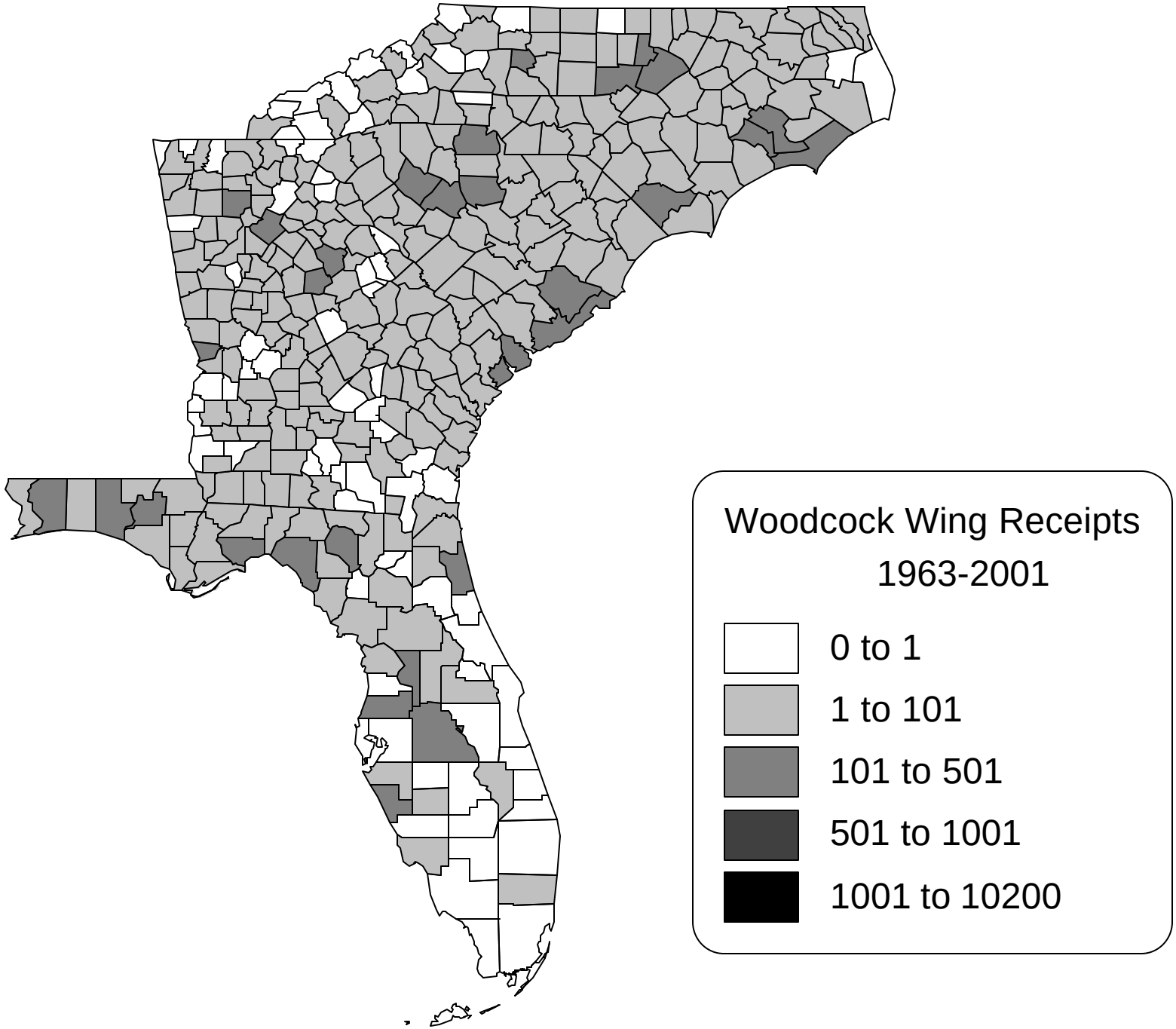
Ownership	Total BCR	LA	TX
Private	1,371,779	980,457	391,322
State	41,594	32,743	8,851
County/Municipal	29,061	7,284	21,777
Other Local Government	10,365	10,365	0
U.S. Fish and Wildlife Service	8,864	8,864	0
Dept. of Defense	9,136	0	9,136
National Forest	0	0	0
National Park Service	0	0	0
Other Federal	0	0	0
All	1,470,999	1,039,713	431,086

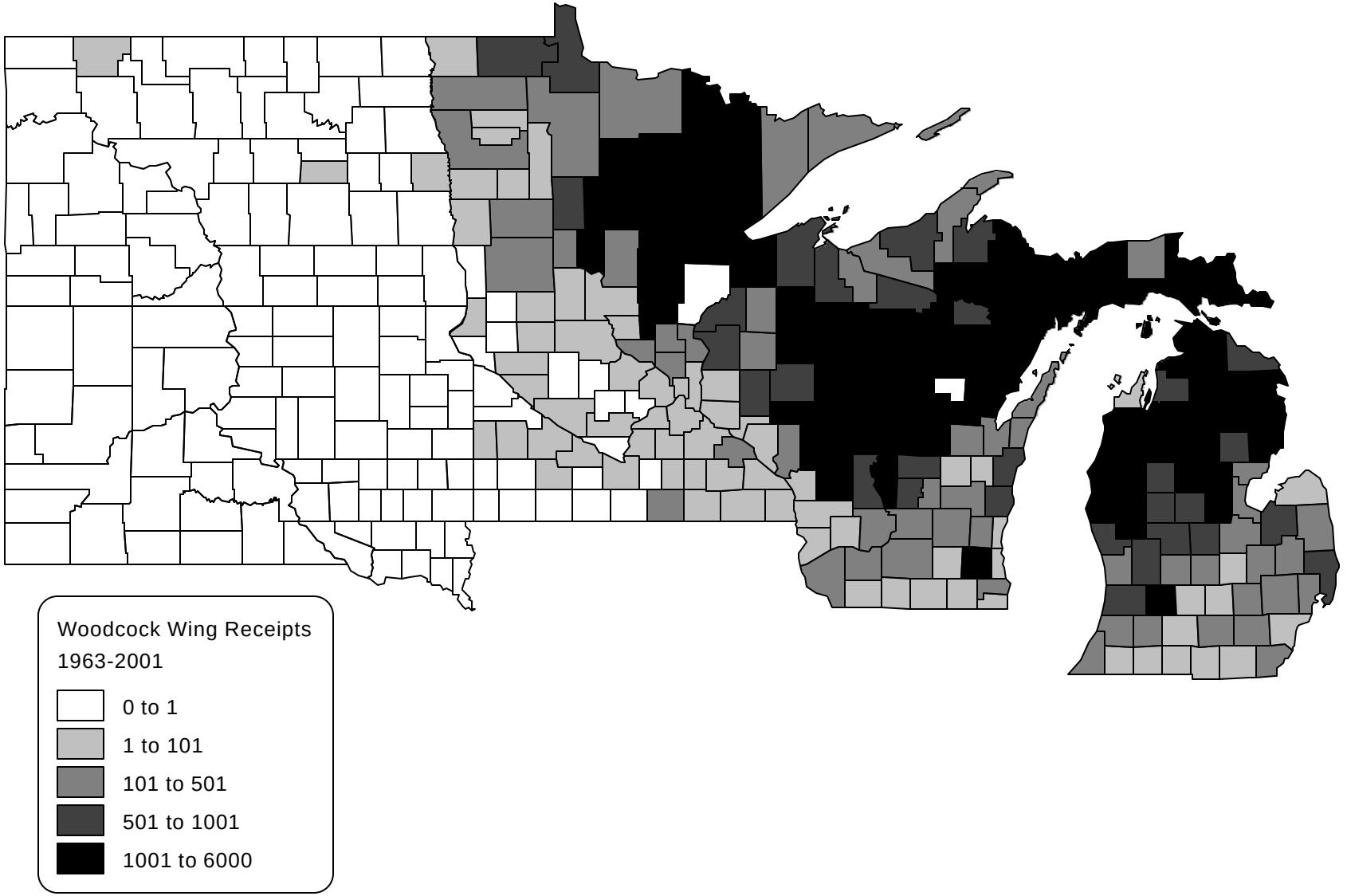
Appendix 1:

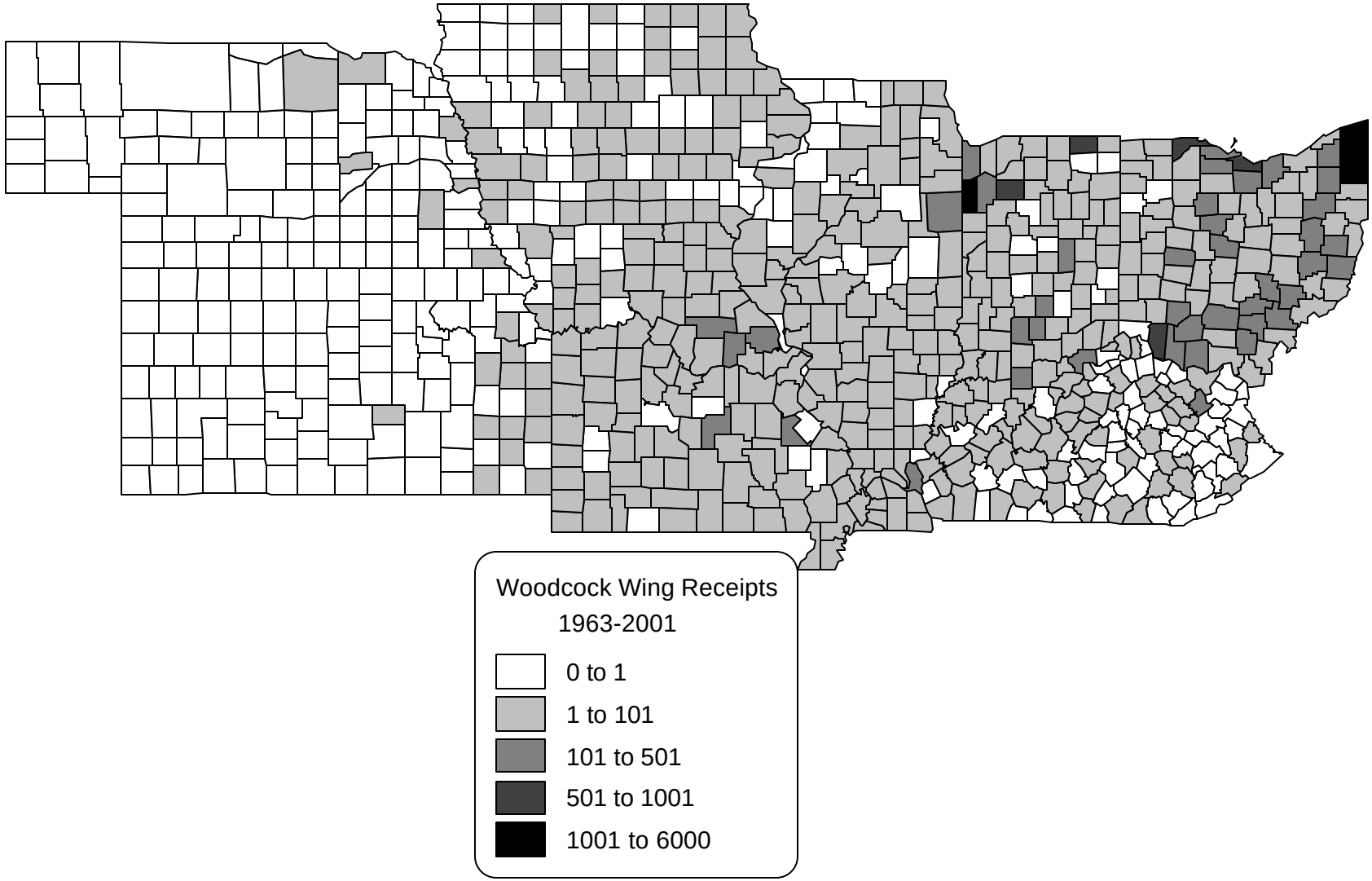
Geographical distribution of American woodcock harvest based on hunter-collected wings

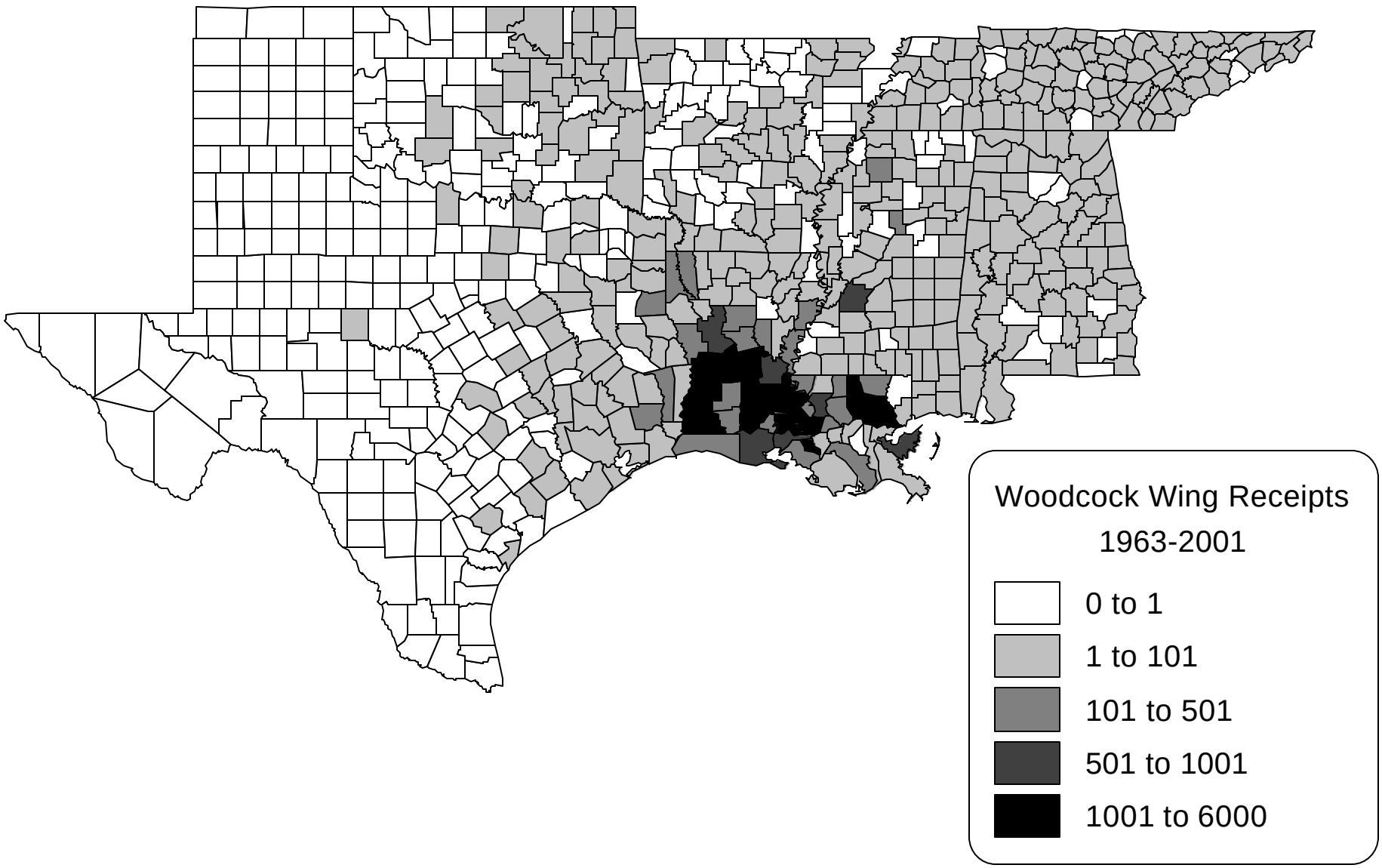

Woodcock Wing Receipts
1963-2001
0 to 1
1 to 101
101 to 501
501 to 1001
1001 to 10200


Woodcock Wing Receipts
1963-2001
0 to 1
1 to 101
101 to 501
501 to 1001
1001 to 10200


Woodcock Wing Receipts
1963-2001
0 to 1
1 to 101
101 to 501
501 to 1001
1001 to 10200


Woodcock Wing Receipts
1963-2001
0 to 1
1 to 101
101 to 501
501 to 1001
1001 to 6000


Woodcock Wing Receipts
1963-2001
0 to 1
1 to 101
101 to 501
501 to 1001
1001 to 6000


Woodcock Wing Receipts
1963-2001
0 to 1
1 to 101
101 to 501
501 to 1001
1001 to 6000

Appendix 2
Calculation of Woodcock Population and Habitat Goals

Population goals

1. Our population goal is to return woodcock ***densities*** in each Bird Conservation Region (BCR) on the breeding grounds (those areas covered by the Singing-ground Survey) to those that existed on suitable habitats during 1970-75. Some habitats have been irrevocably lost to urbanization and development. Therefore, we cannot achieve the same population ***size*** that existed during 1970-75; but we can strive to achieve the same ***density*** that existed during 1970-75 on the remaining habitat base.

2. A = Total land base acreage within BCR.

3. MA = Manageable acres within BCR. Manageable acres refer to the total area of timberland in the BCR as determined by the U.S. Forest Service's Forest Inventory Analysis program.

4. P = Population estimate of singing male woodcock in the BCR as determined by the Singing-ground Survey (see Figure 1).

6. ED = Effective density of singing males = P divided by MA found within the BCR during the time period of interest.

7. ED_{1970} = P_{1970} divided by MA_{1970}

8. ED_{2002} = P_{2002} divided by MA_{2002}

9. DD = Density Deficit = ED_{1970} minus ED_{2002}.

10. PD = Population Deficit = DD multiplied by MA_{2002}. This represents the number of singing males that need to be added to the manageable acres in a given BCR to achieve the density found during 1970-75.

Breeding Habitat Goal

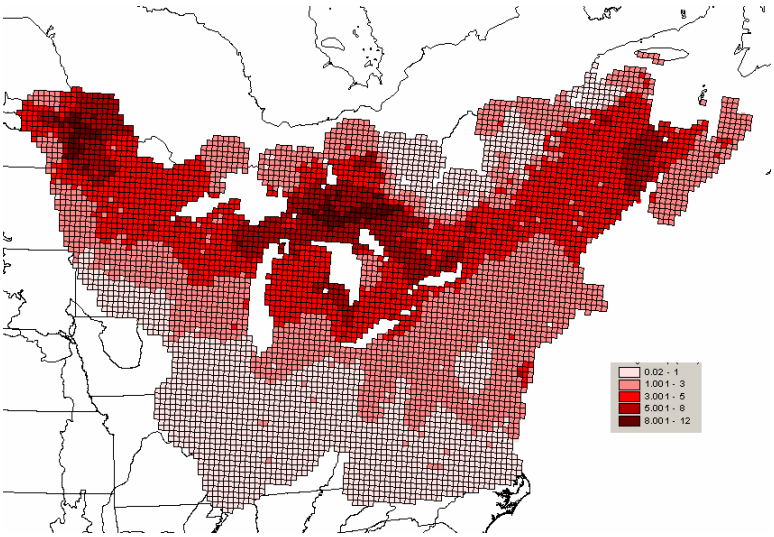
Breeding Habitat Goal for BCR = PD multiplied by the habitat multiplier unique to each BCR (Table 1). The habitat multiplier is calculated as the total amount of early succesional habitat (small diameter plus nonstocked forest inventory categories) found in the BCR during the early 1970s, divided by the number of singing males estimated to be in the BCR for the same period. These are the *additional* acres of woodcock habitat in a given breeding BCR that must be created to produce sufficient birds such that singing male densities will equal those found during 1970-75.

Table 1. Calculation of American woodcock population deficit and habitat goal for BCR 23.

	1970-75		1998-2002
A (total acres in BCR)	63,776,403		63,776,403
MA (manageable acres in BCR) i.e. 3,000 acres lost to development	12,355,950		14,768,003
P (# singing males)	306,005		232,114
ED (effective density of singing males) = P divided by MA	0.0247658		0.0157174
DD (density deficit of singing males) = ED_{1970} minus ED_{2002}		0.00904844	
PD (population deficit of singing males) = DD multiplied by MA_{2002}		133,627	
Habitat Goal = PD multiplied by 11.59 acres of early succession habitat (1970s)/singing male		1,548,742	

Figure 1. Estimated abundance of American woodcock as determined by the Singing-ground Survey (J. Sauer, USGS, unpublished data)

Woodcock Abundance: Early 1970s



Woodcock Abundance: Current